AMERICAN GAS JOURNAL

FEBRUARY, 1938

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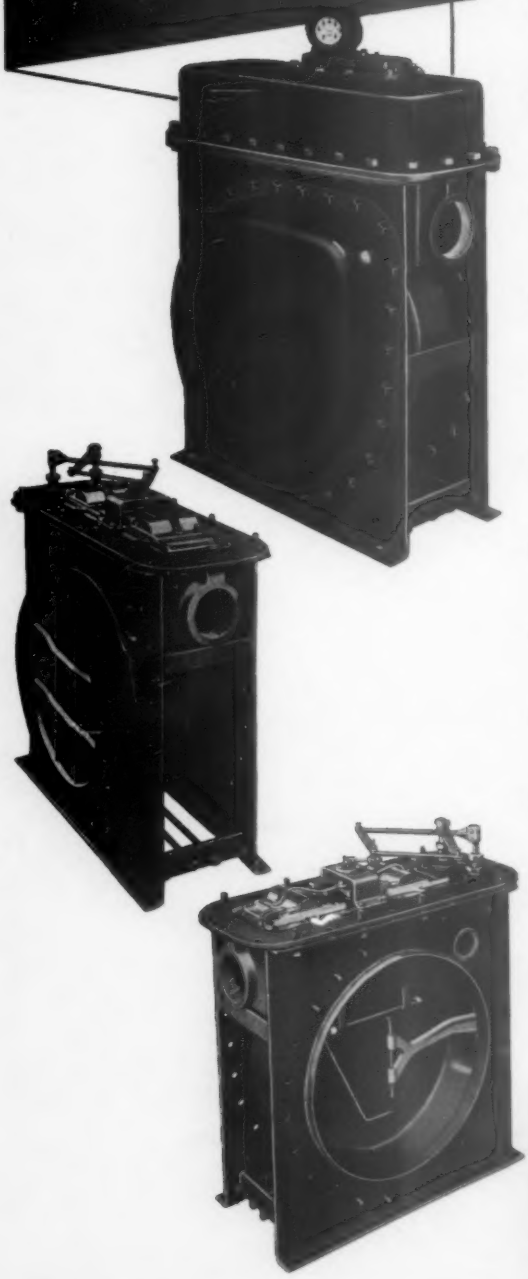

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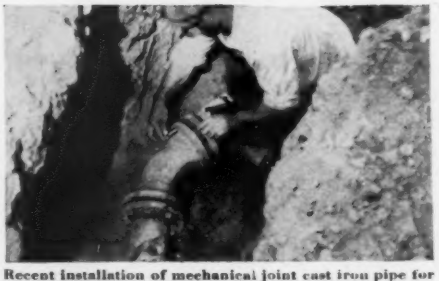

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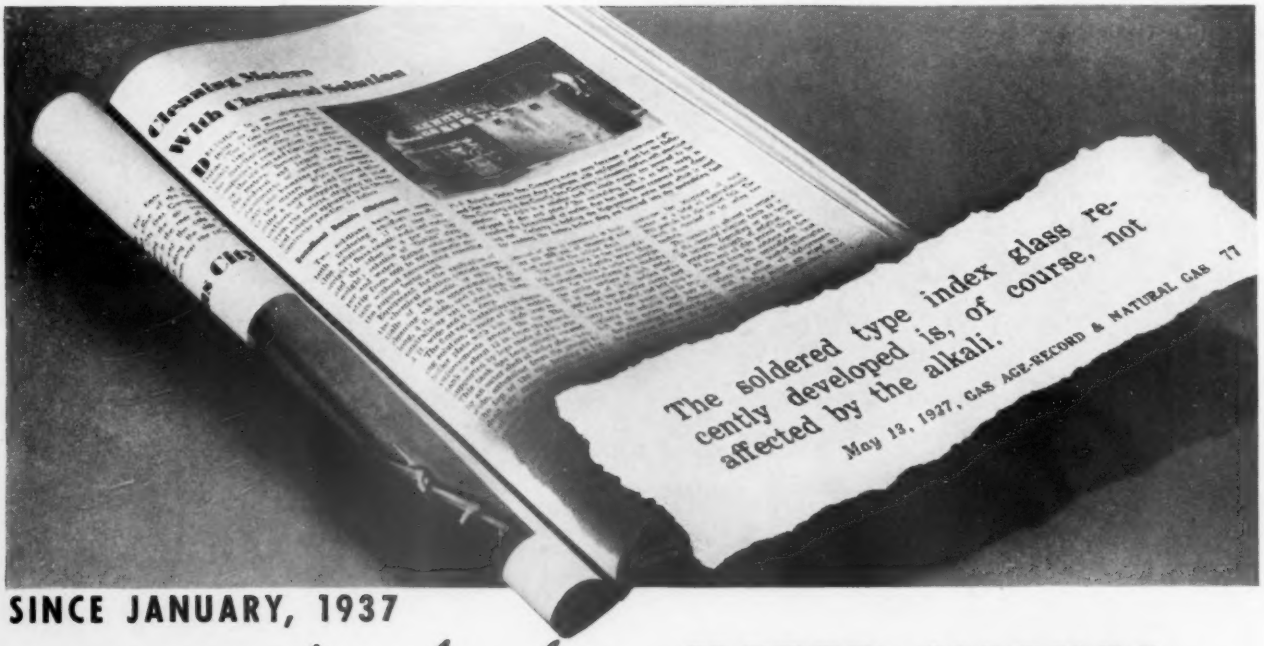
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AMERICAN GAS JOURNAL

VOLUME 148 No. 2

The Curran-Knowles Coke Oven Process

By

Walker W. Stevenson

Consulting Engineer

RECENT developments in producing coal gas in Curran-Knowles by-product recovery coke ovens have attracted the attention of the oil, coal and chemical industries. Rather surprisingly, however, little has been heard of this process in the gas industry, where interest in it should naturally be greatest. These ovens are adaptable inherently to many manufactured gas situations because of their low initial investment, low operating and maintenance costs, long life and ease of operation.

A careful study of the Curran-Knowles process on behalf of clients required observation of actual operations on a visit to the plant of the Radiant Fuel Corporation at West Frankfort, Illinois. At this plant twenty-six Curran-Knowles ovens, coking approximately four hundred tons of Illinois coal screenings daily, have been in continuous operation for several years. These ovens produce from this low grade coal a marketable coke suitable for domestic purposes or for water gas generator fuel. The gas produced at West Frankfort is sold to the local gas company and is distributed to domestic and industrial consumers in surrounding towns

The first battery of ten Curran-Knowles ovens, located at West Frankfort, commenced operating December 23, 1933, and has been in continuous operation since that date. Two additional batteries of eight ovens each have been added at different times since and have also operated continuously.

These ovens are built in the form of an arched rectangular chamber, approximately 30 feet long, 7½ feet wide, and 4 feet high at the top of the arch and 2 feet high at the sides. Heat is applied through flues which

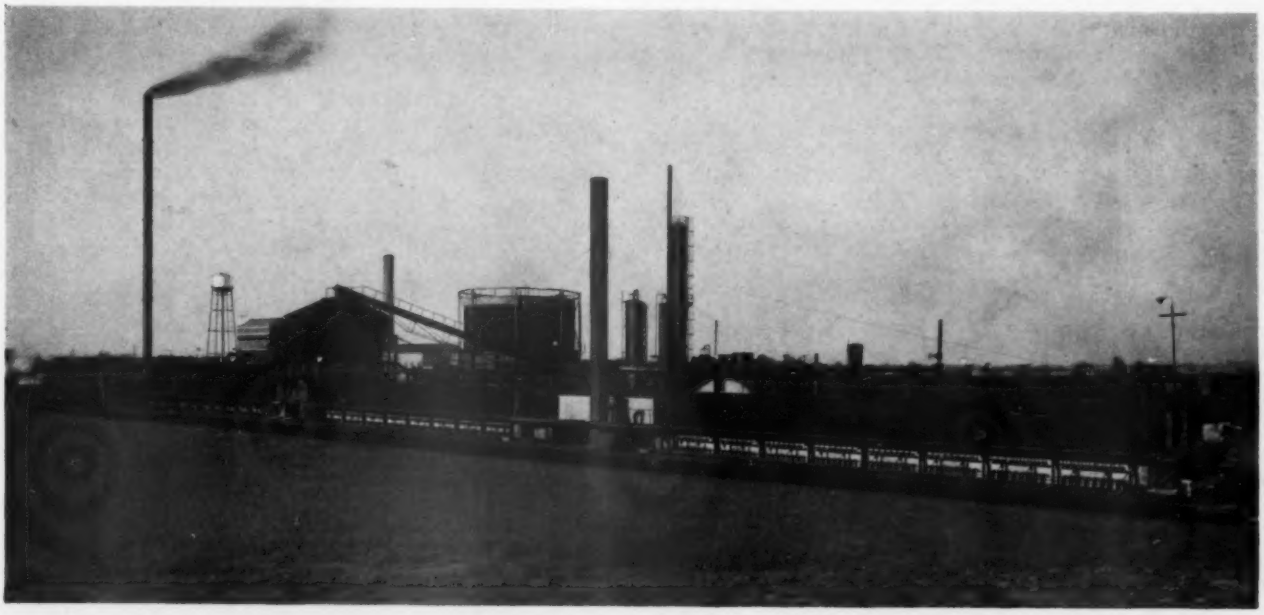


Fig. 1 General View of Curran-Knowles Coke Oven Plant at West Frankfort, Ill.

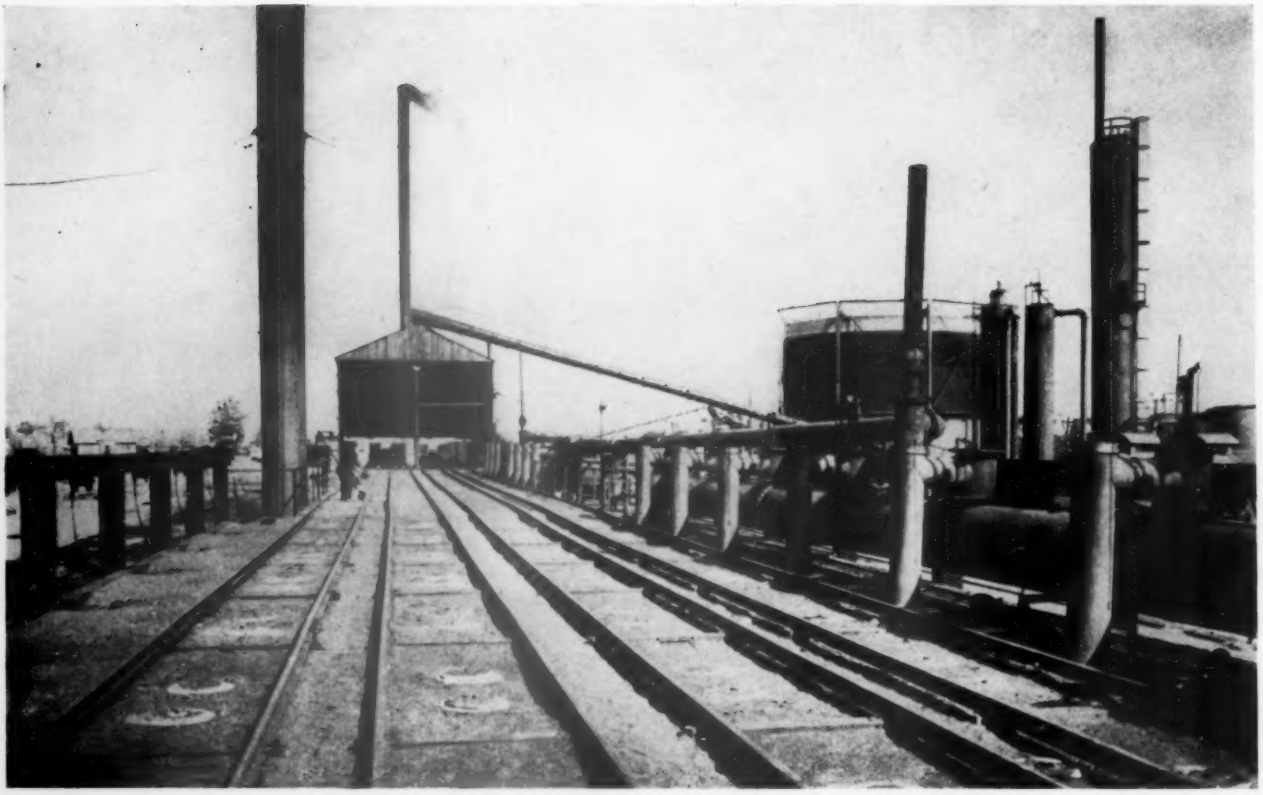


Fig. 2 View Showing Top Construction of Curran-Knowles Ovens at West Frankfort, Ill.

form the floor or sole of the oven. These flues are connected to regenerators built into the oven foundations. Figure 3 shows construction details of the ovens in cross and horizontal section.

The design and operation of the oven permits the use of fire clay brick throughout, except in the floor and sole flues where silica brick is used in order to permit operation at standard high temperatures. The greater part of the brickwork is composed of standard size bricks, which accounts in part for the low cost of construction per ton on annual capacity. The use of fire clay brick also provides a flexibility in operating the ovens which is not possible where silica brick comprises the major part of the structure. After carbonization the coke is pushed from the oven into a quenching car and from there handled in the usual way.

At the West Frankfort plant a liquid purification tower removes the bulk of the sulphur from the gas and is followed by oxide boxes for removal of the smaller traces of sulphur not economically removed in the liquid purification unit. Fuel gas for oven heating is drawn from the lines after tar removal but before purification, since that portion of the gas can be used even though carrying the normal raw gas sulphur content. The surplus gas produced is sold for public utility distribution in a group of nearby towns and is pumped into the mains at high pressures by gas engine driven compressors.

One of the most interesting features of this operation is the extensive use of small internal combustion engines for driving all of the various types of equipment. Use of the automobile type of engine as motive power required the development of modified carburetor equipment to utilize successfully the purified surplus gas as fuel. This type of engine is used on the pusher, charging car and quenching car, as well as for the stationary equipment such as coal and coke conveyors, exhausters, fans, compressors and centrifugal pumps. Purified oven gas is supplied through pipes to engines connected to all of the stationary equipment but on the moving equipment—pusher, charging and quenching cars—benzol drip and/or gasoline is used. The use of engines fueled with gas is a new and ingenious development which has proved satisfactory by four years of operation. Aside from the fact that the initial investment is much less than would be required with electric motors, the expense and space required for a steam-electric generating plant is eliminated. The entire plant runs on its own power at very low cost.

This simplicity of plant design and the elimination of considerable equipment usually included in coke plant apparatus, naturally result in lower maintenance costs because of the lesser amount of equipment required to operate the plant. Power loads are smaller, materially reducing the investment in power units and maintenance costs on the more expensive machinery. Also there is a total absence of maintenance charges on steam and steam-electric plant.

Compared with slot type ovens the Curran-Knowles ovens require more ground area per ton of coal coked. However, considering the two types of plants as a whole, the space required is practically equivalent. This fact is due to the ingenious design and engineering which has produced a process requiring no high pressure steam boiler plant, electric power plant or accessories.

Gas and vapors driven off during carbonization are collected in a hydraulic main on top of the battery in substantially the same manner as is customary for standard high temperature ovens, and regulation of back pressures is controlled in the usual way. The ovens are heated by a portion of the oven gas after

scrubbing in accordance with standard practice. Fuel gas regulation and stack draft regulation require no special mention as they conform to the well known methods.

The writer observed one oven, out of service, with the ovens on either side continuing in normal operation. The discontinued oven was cooled off and returned to operation in much shorter time than has been the writer's experience with the usual type of oven. The observation of the oven internally inspected indicated that all parts are easily and independently accessible.

The Curran-Knowles oven processes a layer of coal 10″ to 12″ in depth, spread and levelled off on the oven floor. Coking progresses at approximately 1″ per hour, with a carbonizing temperature in the flues below the floor of 2500° to 2600° F. coal without after-cracking and bring about a cementing action not otherwise possible, so that feebly coking coals are converted into a strong coke substance. Due to this cementing action, the braize, normally produced in coking plants and sold at a depressed price, can be mixed with the coal and recoked without impairing the quality of the coke.

The Curran-Knowles process thus opens up several new fields in carbonization. The plant now operating on Illinois coal at West Frankfort, Illinois, is coking a material which would not produce merchantable coke in any other known commercial process.

Wet coals can be coked as efficiently as low moisture coals because the hot gases passing up through the coal remove all free water as steam. Expanding coals can be coked as coking coals but their use has been restricted on account of their expansion characteristic. Most by-product coking plants use from fifteen to twenty-five per cent of low volatile coal in their mixture to improve the coke quality. In Curran-Knowles ovens it is possible to use these low volatile coals exclusively and thereby have the full advantage of their superior coking properties.

High volatile coking coals which normally produce a splintery hard coke, entirely unsuited for the requirements of either metallurgical or domestic furnaces, can be carbonized in the Curran-Knowles process; and the resultant coke is strong, reactive and possesses ideal burning characteristics. This is due to the upward passage of the gases and the cementing action mentioned above.

The coal regularly used at West

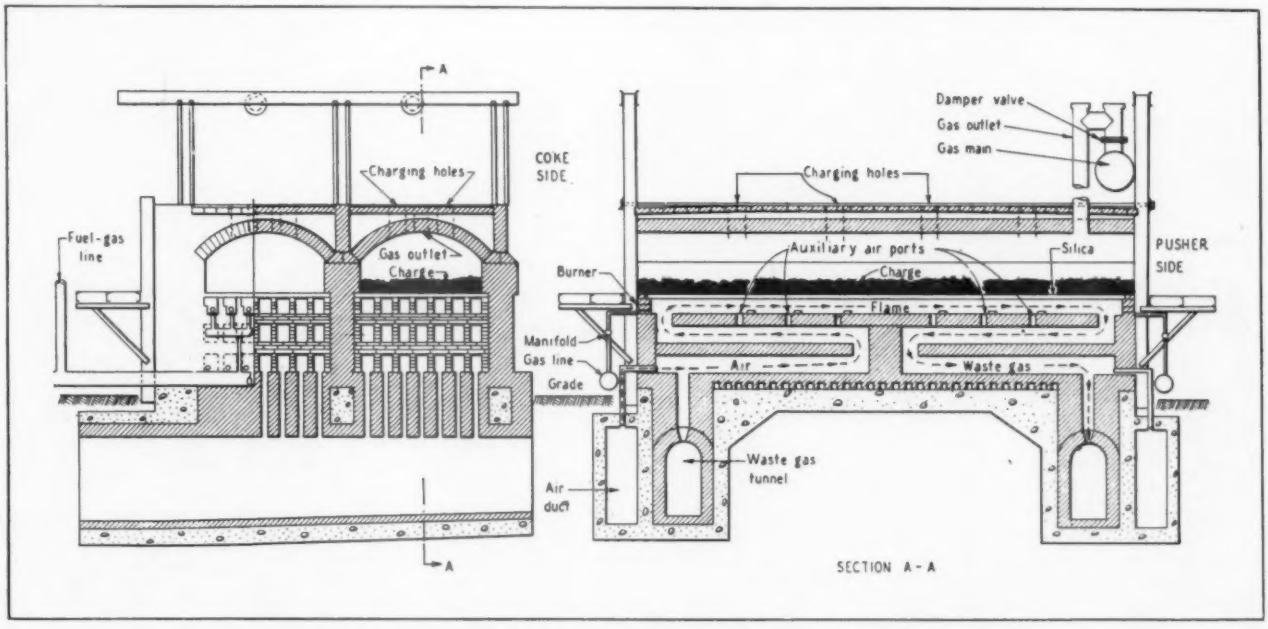


Fig. 3 Construction Details of Knowles Sole-Flue Oven. Scale omitted.
(From "Coke from Illinois Coals," by G. Thiessen, Ind. and Eng. Chem., vol. 29, May, 1937.)

The coke produced has strength and toughness, comparing favorably with ordinary high temperature coke, though somewhat lighter. The absence of secondary cracking of tar and oil vapors during any part of the coking operation, eliminates the graphitization of the coke surface. As a result the coke has notable ease of ignition and rapid combustion characteristics similar to low temperature coke. Depending on the coal used, excellent domestic and/or foundry and/or water gas generator coke is obtained.

Probably the most important characteristic of the Curran-Knowles process is the application of heat to the underside of the coal charge only. The gases flow upward through the easily as shrinking coals. Expansion takes place vertically without placing any strain on the brickwork. The writer witnessed the successful coking of coals which expanded as much as twenty-five per cent of their volume and was informed that coals expanding forty per cent were coked equally as well. Coals richest in fixed carbon (the low volatile or smokeless coals) are as a class highly expanding. In other words, when coals of this class are coked they swell, and when coked in a confined space such as is provided in the ordinary vertical slot type oven, the force of the expansion is sufficient to seriously damage the oven structure. These coals are known to have a higher coking index than any other class of Frankfort is Illinois 5/16″ slack from local mines. It is dumped into a railway track hopper and conveyed to the coal charging bin over the ovens without any crushing, pulverizing, blending or other preparation. Other coals from the Pocahontas fields of southern West Virginia, Central Pennsylvania high and low volatile and Kentucky and northern West Virginia, are also handled in the same manner.

The writer was particularly interested in checking the excellent results claimed when using low volatile Pennsylvania coals, some strongly swelling, as well as Pocahontas, slightly less swelling, and high volatile Elkhorn coal. Excellent coke was observed to be obtained from

each of these coals without mixing with any other coal and without further grinding or preparation. There are many localities where highly swelling coals are available in unlimited quantities at lower prices than the usual type of coking coals and these could undoubtedly be used successfully in Curran - Knowles ovens.

Results obtained from coking a low volatile swelling coal, ⅝" slack, 11½ hour coking time, follow:

	Coal Analysis	Coke Analysis
Volatile	18.34	1.67
Ash	5.54	7.00
Sulphur	.91	.80
Shatter Test On 2"		86.22
On 1½"		97.64

Results obtained from coking high volatile gas coal, 1¼" screenings, 11½ hour coking time, follow:

Low Volatile Coal

Analysis of Gas Produced from a Single Oven Throughout the Cooking Period

Time	CO_2	Ill.	O_2	CO	CH_4	H_2	N_2
8:00 to 9:00 A.M.	1.4	1.8	.4	3.8	34.2	54.2	4.2
9:00 to 10:00 A.M.	1.0	1.6	.4	3.8	34.4	53.5	5.3
10:00 to 11:00 A.M.	.8	1.2	.4	4.4	30.1	55.2	7.9
11:00 to 12:00 Noon	.8	1.2	.4	4.6	30.1	53.4	9.5
12:00 to 1:00 P.M.	.8	1.0	.6	5.0	27.1	57.0	8.5
1:00 to 2:00 P.M.	.8	1.0	.6	5.0	25.7	58.4	8.5
2:00 to 3:00 P.M.	.6	1.0	.6	5.2	27.1	57.7	7.8
3:00 to 4:00 P.M.	.4	.8	1.0	5.8	26.9	56.6	8.5
4:00 to 5:00 P.M.	.8	1.4	.4	5.4	25.4	58.0	8.6
5:00 to 6:00 P.M.	.6	1.0	.6	5.4	25.6	57.5	9.3

Gas produced..... 7,718 cu. ft. per ton
Tar produced..... 12 gallons per ton

	Coal Analysis	Coke Analysis
Volatile	36.18	1.96
Ash	6.77	8.81
Sulphur	.95	.84
Shatter Test On 2"		54.00
On 1¼"		77.00

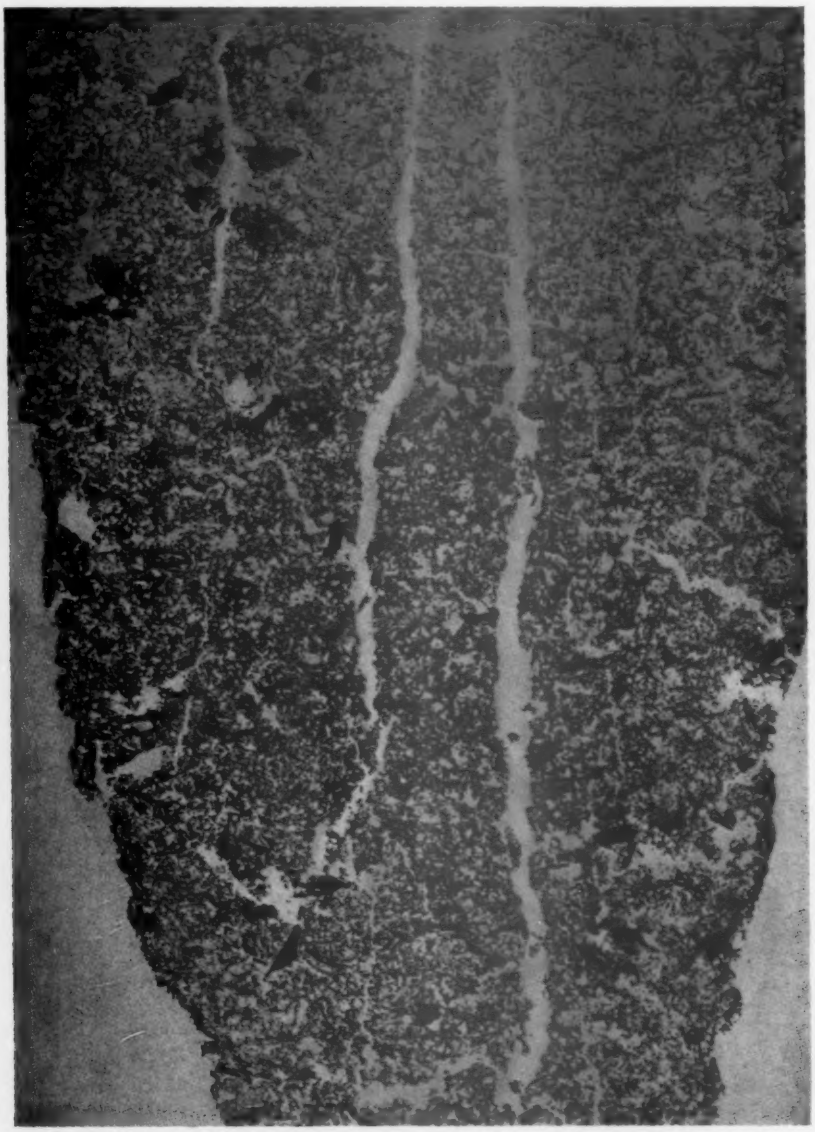


Fig. 4 Rose Longitudinal Section, Natural Size, of Specimen of Sole-Flue Oven Coke. Bottom of photograph illustrates structure near the end of the specimen resting on the oven floor.

Gas and tar results will be commented on later.

The two coals previously mentioned also yielded results as shown in above tables.

It should be understood that in the Curran-Knowles process where normal coking time is twelve hours, results are not necessarily comparable in every way with results from coking the same coal for the same period in the usual type of by-product coke oven. It is not to be expected that total gas produced per ton of coal will be as high because the coal in Curran-Knowles ovens is coked by heat from the bottom only. Yet total gas from low volatile coal has been obtained under test as high as 7,718 cubic feet per ton dry coal and from high volatile coal under test as high as 10,323 cubic feet per ton dry coal. Longer coking time would, of course, increase the gas yield and further reduce the volatile matter in the coke. The plant is operated to get the most economical results under local conditions and is susceptible of great flexibility of controlled operation.

Definite fuel gas consumption records have not been released by the company, but they were observed to be well below the million eight hundred thousand or two million B.T.U. per ton of coal required in other types of ovens or retorts.

Total surplus gas is, of course, dependent on the coal used. However, a great flexibility of gas production can be obtained by the use of oil or producer gas, or, under certain conditions, even blast furnace gas or kiln gas, if available.

The tar recovered from this coking process is collected in the usual manner from scrubbers, decanters, etc. The yield, varying according to coal used, is much higher than from slot type ovens or retorts. The tar contains thirty to thirty-five per cent of cresylic and other tar acids, more

High Volatile Coal

Analysis of Gas Produced from a Single Oven Throughout the Cooking Period

Time	CO_2	Ill.	O_2	CO	CH_4	H_2	N_2
11:00 A.M.	2.4	6.4	.4	6.8	37.4	39.5	7.1
12:00 Noon	2.2	5.2	.4	6.8	38.4	41.0	6.0
1:00 P.M.	2.2	5.0	.4	7.0	36.7	42.9	5.8
2:00 P.M.	2.0	4.2	.6	6.4	36.0	43.6	7.2
3:00 P.M.	2.0	4.0	.6	6.6	34.6	45.3	6.9
4:00 P.M.	2.0	3.6	.6	6.2	37.3	43.1	7.2
5:00 P.M.	2.0	3.8	.4	6.4	34.9	46.5	6.0
6:00 P.M.	2.0	3.2	.6	6.2	33.9	46.9	7.2
7:00 P.M.	1.8	3.0	.6	6.8	32.2	47.6	8.0
8:00 P.M.	1.8	2.6	.2	6.2	32.8	49.2	7.2
9:00 P.M.	1.8	2.2	.2	6.0	31.7	50.6	7.5

Gas produced..... 10,323 cu. ft. per ton
Tar produced..... 15 gallons per ton

than double that typical of high temperature tar. It, therefore, brings premium prices. The tar normally contains about two per cent of free carbon and is very fluid at normal temperatures. These tars find a ready market in the plastic and insecticide industries.

The adaptability of this process to a particular problem coming to the writer's attention may be interesting. A small plant, short of water gas generating capacity, was faced with the necessity of expansion, improvement or modernization. A thorough examination indicated that the most economical solution would be the erection of sufficient Curran-Knowles ovens to produce all the coke required for operation of the water gas plant. The purchase of satisfactory low priced coals would result in the cost of such coal gas as was produced being less than the present cost of water gas. The coke produced would cost less than the coke purchased at present and, therefore, the cost of water gas would be reduced also. Prices taken into the calculations include coal at minimum figures set by the National Bituminous Coal Commission, and costs include fixed charges.

Another client, a coal mining company, finding reduced demand for slack and unable to fill prepared coal orders, plans erection of these ovens to convert the slack, mine sweepings, bug dust, etc., into merchantable coke, sold profitably even though the gas may be burned under the mine boilers. The tar produced will find a ready and expanding market.

The conclusions of the writer may be set down rather briefly. The Curran-Knowles ovens, in operation, have provided adequate proof that feebly coking coals, swelling coals or coals that have deteriorated in storage, as well as freshly mined coals, even though considered as non-coking, may be converted into a strong coke substance. These ovens can be built, maintained and operated at low cost. Small unit installations (150,000 to 200,000 cubic feet daily) or large plants, can in many cases be built to produce gas and/or coke considerably cheaper than its present cost, thus presenting a picture of economic advantage to the gas and coal industries.

A very complete report on the coking of Illinois coal in these ovens is found in Bulletin No. 64 of the State of Illinois—State Geological Survey by Gilbert Thiessen.

Other articles on this interesting subject appear in Industrial and Engineering Chemistry, May 1937, by Gilbert Thiessen; and Chemical and Metallurgical Engineering, June 1935, by R. S. McBride.

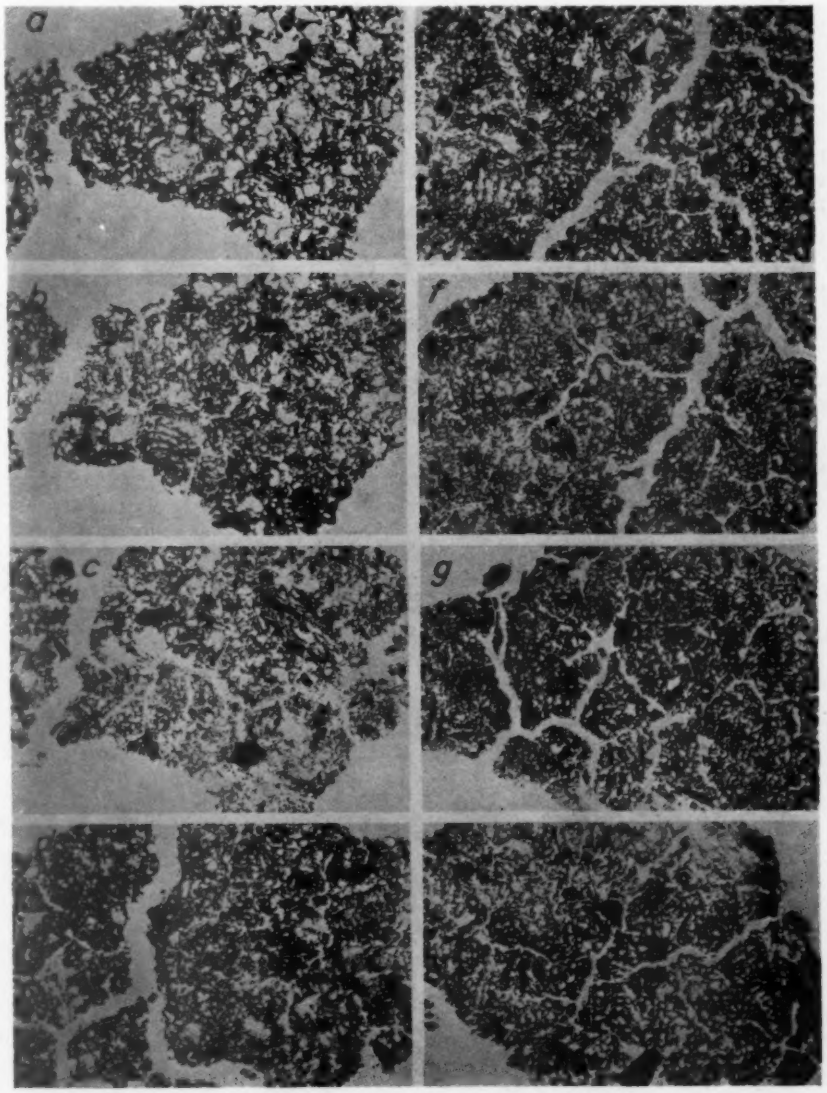


Fig. 5 Rose Cross-Sections, Natural Size, of Sole-Flue Oven Coke Representing Horizontal Cuts in the Same Specimen. a. Section through top of specimen. b. through g. Sections at successive 1¼ inch levels from top toward bottom of specimen. h. Section through bottom of specimen which rested on the floor of the oven.

The Choice of a Burner System

by

Raymond F. Mann

Wentz-Mann Company
Kenmore, N. Y.

SOME time ago, a large steel fabricating plant in our city proposed to build a fair sized plate furnace in which steel slabs would be heated before shaping. The furnace hearth was to be 8 feet square with an arch 12 inches high at the spring and 24 inches at the crown. The maximum capacity contemplated was the heating of three plates an hour, 74 inches by 90 inches by $\frac{9}{16}$ inches to a temperature of 1750° F.

Making the usual check, we find that the total weight of the three slabs is 3,180 pounds and hence the loading amounts to 50 pounds per square foot of hearth, a safe figure. As a further check we applied the old rule of thumb of $\frac{1}{8}$ inch penetration per 5 minutes. Since the slabs were to rest on rails, heating would proceed from both sides and ample time was available.

It so happened that this was just before the days of insulating firebrick and the construction proposed was 9" of high grade firebrick backed by 4½ inches of insulating brick for sidewalls and arch. Today, of course, it would be impossible to overlook the economy of operation obtained by means of the insulating firebrick so commonly employed. With the above construction, however, our calculations called for a burner capacity of 4,000 cubic feet an hour of our 900 Btu. mixed gas. Further it was decided to use overfiring employing seven tunnel burners staggered on the two side walls firing at a 15° angle along the arch.

The question then arose as to the burner system to use. Other uses of gas in this plant were of a minor character and this new furnace would necessitate an entirely new layout including a new lateral from our main, meters, and all houseline. Plant air was not available in adequate quantities and a blower or compressor would have to be purchased if necessary. We therefore made a careful study of the relative advantages and costs, both initial and operating, of the three systems of burner equipment that we favored for this particular application. All three, of course, had to be of the automatically proportioning type, furnishing the correct mixture of gas and air for proper combustion to the burners at all times and over a wide range of turndown. It is the observations and conclusions we made in this connection that form the basis of this article.

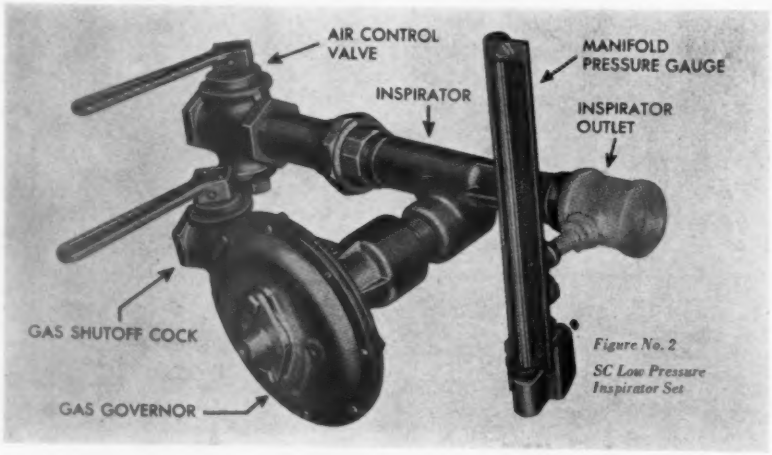


Figure No. 2
SC Low Pressure Inspirator Set

Case 1

The fundamental difference in the three burner systems we studied is in the medium used to bring about the admixture of the air and gas, the medium whose static pressure furnishes the energy necessary. These three mediums are, in the order in which they will be discussed, low pressure air, high pressure air, and high pressure gas.

Case 1. Low pressure air. (Illustrated by the Surface Combustion Low Pressure System and the McKee Series LP). Here air at one to one and a half pounds pressure in an amount equal to the total required for complete combustion acts as the entraining medium. It is passed through an insert or jet wherein a restricted throat transforms its static pressure into velocity pressure. The latter sets up a negative pressure or suction around the jet and it is here that the gas is introduced after it has been passed through a governor or reducing valve where the line pressure has been reduced to zero or atmospheric pressure. Proper design permits of constant proportioning of gas to air over a wide range of air flow. Complete mixing follows and the resultant mixture is delivered through a manifold to the burners at a pressure generally from 6 to 9 inches of water.

Case 2. High Pressure Air. (Illustrated by the McKee Series HPA and HPS, and the Surface Combustion combination of LP sets with a high pressure air inspirator.) This case is but a modification of Case 1. Air at any pressure from 15 to 90 pounds is utilized but only to the extent of approximately one-fifth of the amount needed for complete combustion. (The exact quantity varies with the pressure and design). In the Surface Combustion method this small amount of high pressure

air is passed through an orifice in a venturi mixer and draws in from the atmosphere the remainder of the air needed. The resulting mixture of air leaving the venturi is at approximately one pound pressure and when conveyed to the low pressure set described above under Case 1 duplicates its action. The venturi mixer hence serves merely as a reducing valve having the advantage over the diaphragm type of valve used in steam work in that but a small part of the total air has to be furnished at high pressure. In the McKee systems again but a fraction of the air is needed at the high pressure but they differ from the Surface Combustion in that specially designed equipment is used in which the atmospheric air and gas are drawn in at the same time in a single integrated piece of equipment.

Case 3. High Pressure Gas. (Illustrated by the Venturi Inspirators manufactured by Eclipse, Surface Combustion, North American, Maxon, Hones, and others.) Here gas at a pressure, generally of from 10 to 20 pounds, either as furnished by the Gas company or after compression in the ordinary one stage compressors commonly used for high pressure air, is the entraining medium. The actual pressure necessary for complete entrainment of the air varies with the heating value of the gas, the lower Btu. gases that require less air for complete combustion operate on lower pressures (thus producer gas only requires 1 pound as against 35 pounds for propane.) The high pressure gas is passed through the orifice of a venturi mixer where it develops sufficient velocity pressure to draw in the necessary air from the atmosphere. The resulting mixture pressures are below those of Cases 1 and 2 and for the ordinary commercial gases run from 1 to 4 inches of water.

Now to consider the relative advantages and disadvantages of these systems from the operating standpoint.

Case 1. Low Pressure Air

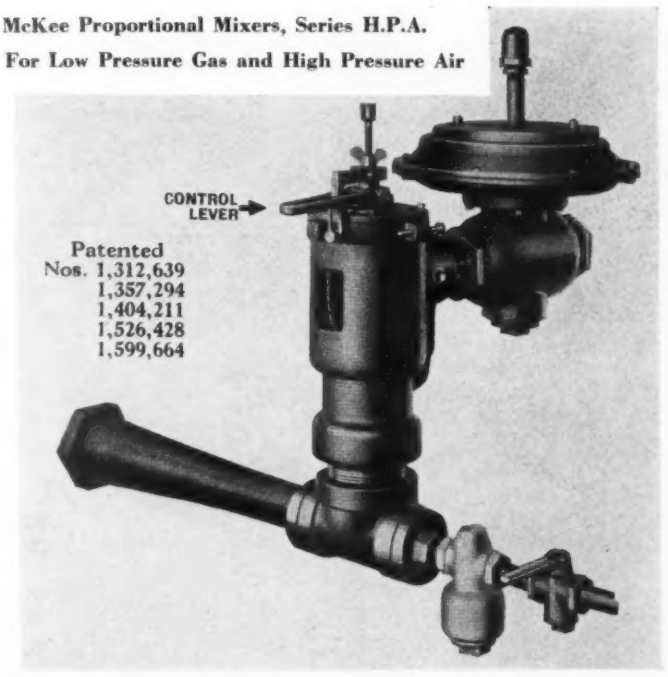
Advantages

High manifold pressure permitting good turndown.
Easy and positive atmospheric control.
Quietness.
Totally enclosed, unaffected by room dust or drafts.

Disadvantages

Two pipe layout, hence more difficult and expensive to pipe.
Larger gas and air supply lines required.
Greater service demands.
1. Diaphragms may dry out. Must be protected from heat.
2. Valves in zero governors may bind.

McKee Proportional Mixers, Series H.P.A.
For Low Pressure Gas and High Pressure Air



Case 2

Case 2. High Pressure Air

Advantages

None over Case 1 unless plant air is available and the saving in initial investment is important. (False economy as will hereafter be shown.)

Disadvantages

Noisy. As a general rule the inspiration of atmospheric air by the high pressure air is attended by a piercing noise that often makes a muffler of some type necessary.
With automatic control, the control valve must be able to stand the full air pressure.
Occasional moisture troubles from wet compressed air.
The other disadvantages of Case 1.

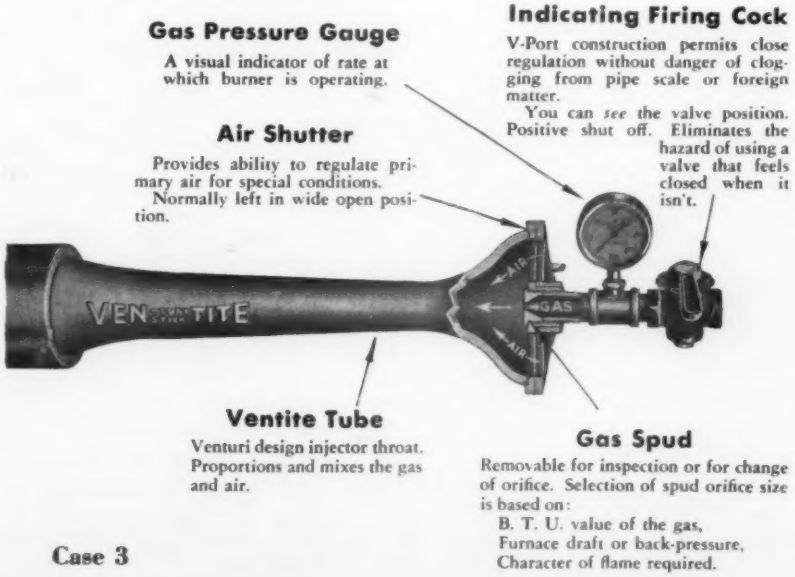
Case 3. High Pressure Gas

Advantages

One pipe system. Easiest and least expensive to pipe.
Most simple to understand and operate.
No moving parts and hence negligible service.

Disadvantages

Lower manifold pressure reduces turndown.
More difficult to change atmosphere.
Dusty surroundings may require frequent cleaning.


Gas Pressure Gauge
A visual indicator of rate at which burner is operating.
Air Shutter
Provides ability to regulate primary air for special conditions. Normally left in wide open position.
Indicating Firing Cock
V-Port construction permits close regulation without danger of clogging from pipe scale or foreign matter.
You can see the valve position. Positive shut off. Eliminates the hazard of using a valve that feels closed when it isn't.
AIR
GAS
AIR
Ventite Tube
Venturi design injector throat. Proportions and mixes the gas and air.
Gas Spud
Removable for inspection or for change of orifice. Selection of spud orifice size is based on:
B. T. U. value of the gas,
Furnace draft or back-pressure,
Character of flame required.

Case 3

Turning now to the economical viewpoint and dividing costs into the two natural subdivisions of initial investment and operating costs, we find the following:—

A. Initial Investment — Compressing Equipment

Case 1. Low Pressure Air

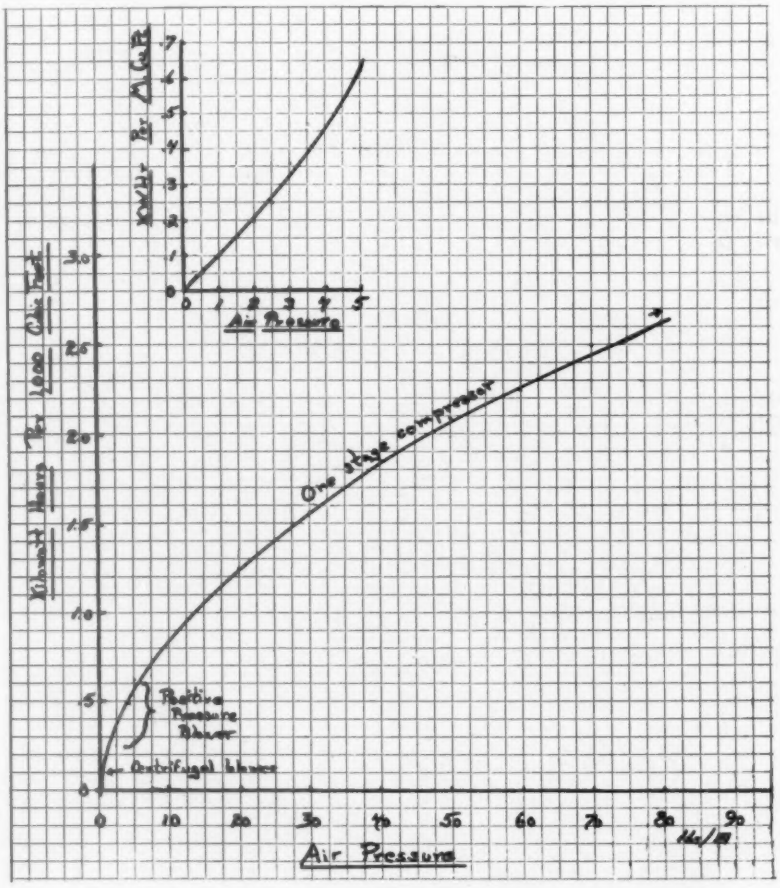
Requirements: — 36,000 cubic feet air per hour at 1 to 1½ pounds pressure = 600 CFM.

Available Equipment:—Three types of equipment are on the market for producing air at this pressure, namely:— centrifugal pressure blowers, turbo compressors, and positive pressure or rotating displacement blowers. Considering these in the reverse order, the positive pressure blower has certain inherent disadvantages for our purpose that cause us to reject it here. It operates on the principle of trapping air between impellers which are rotated one on the other in such fashion as to compress the air between them and the casing. The impellers are driven at a constant speed and hence the quantity of air compressed remains constant regardless of demand and the excess air has to be vented through a relief valve (or returned through a regulator to the inlet side). Thus the power requirement remains at the maximum regardless of actual use of air. Furthermore, the clearances between impellers must be very close and hence accurately machined. Natural wear and tear increases these clearances, reducing pressures and capacities and hence efficiency. A pulsating throb in pressure is frequently noticeable as well as the noise of the machine.

We come therefore to a comparison of turbo-compressors and centrifugal blowers. These are basically the same, differing mainly in the design of the rotating element. As a broad generalization the centrifugal blower is primarily designed for lower pressures and greater volumes. While its pressure curve remains nearly constant regardless of load and the power consumption varies almost exactly as the load, the turbo-compressor is usually superior on both counts. The efficiency of the turbo is also usually higher, illustrated by the fact that 5 horsepower motors are used in the turbos listed below as compared to 7½ horsepower for centrifugal blowers of equal capacity and pressure.

Size Equipment:—

Spencer Turbo-Compressor No. 1005



Based on data by
C. F. Olmstead. H. T. & F. June 1930

North American Turbo-Compressor No. 1716G
Buffalo Forge Steel Plate Turbo-Blower Special

Cost:—

App. $450-500, including 5 HP, 60 cycle 3 ph motor.

Case 2. High Pressure Air

Requirements:—App. 20% of 600 CFM of air at 20 to 80 pounds pressure. Say, 120 CFM at 80 pounds.

Available Equipment: — One or two stage reciprocating compressors as manufactured by a number of concerns such as Chicago Pneumatic, Ingersoll-Rand, Sullivan, Worthington Pump, and others.

Size Equipment:—

8x8 Reciprocating compressor with a 25 HP motor.

Cost:—

App. $1100. plus 25 HP motor.

Case 3. High Pressure Gas

Requirements: — 4,000 cubic feet gas an hour at 15 pounds pressure or 67 CFM.

Available Equipment: — One stage reciprocating compressor manufactured by companies listed above.

Size Equipment:—

7x5 reciprocating compressor.

Cost:—

App. $625. plus a 7½ HP motor.

A. Initial Investment — Burner Equipment

Case 1. $546.00
Case 2. 660.00
Case 3. 420.00

This cost of burner equipment is given only as a rough guide. The figures in question happened to be those for the particular burners the author chose. Naturally a wide latitude is available depending on the make, number, and type of burners the individual industrial engineer favors.

A. Initial Investment—Lines and Piping Labor

Unfortunately no attempt can be made here to give actual figures as the size of the plant, the location of gas mains, compressors, and furnaces, together with local labor and material costs will vary so widely that each case must be estimated separately and judged on its individual merit. We can say, however, quite definitely that Case 3 involving but one set of lines (gas) and those of reasonable size will be far the cheapest. Conversely, Case 2 will be the most expensive.

B. Operating Cost—Fuel Cost

At the outset it should be made clear that for all practical purposes the fuel consumption will be the same for all three cases. Assuming burner equipment of the proper size, properly adjusted, in all three cases the same mixture will be delivered to the same location in the furnace in the same amounts. Hence the furnace efficiency will be the same and the fuel consumptions identical.

B. Operating Cost—Power Cost

Case 1. $.036 per hour.
Case 2. .189 " "
Case 3. .043 " "

Electricity assumed at 1 cent per KWH.

These figures will, of course, vary with the efficiency of the particular compressor involved but have been chosen as representing average efficiencies in actual practice rather than those theoretically possible.

Conclusions:—

We should now be in a position to draw conclusions from the data presented and at the first glance several points stand out. The first fact that strikes home is the poor argument that can be made out for Case 2, high pressure air. It is found to have the greatest number of operating disadvantages and to be the most expensive on all counts, both initial and operating. For a new plant starting from scratch it has nothing to recommend it. For an existing plant already equipped with a high pressure air compressor having excess capacity it has the sole advantage of saving the initial investment otherwise necessary. But even here it is false economy. High pressure air is expensive, and when the operation of the gas furnace calls for running a compressor that would otherwise be idle its cost is tremendous. We should therefore discard Case 2 from consideration.

The second point that stands out is that the power cost varies but little whether we compress the gas to 15 pounds pressure and use it to inspirate the air or compress nine times as much air as gas to one pound pressure and use that as the entraining medium. In either case the actual power cost is extremely small and justifies the usual neglect of the industrial gas engineer to include this item in his cost estimate.

The next point is that the initial investment in burner equipment and compressor is but slightly lower for Case 1 than for Case 3. Actually, when the cost of piping is taken into account Case 3 will be the least expensive. Just how much so can only be determined by actual reference to the plant in question. The larger the plant, the greater the difference.

Thus it sums up to this. In a large plant with a number of furnaces, the freedom from service difficulties, the simplicity of operation, the ease with which ordinary labor can be instructed in its use, all contribute their share towards the desirability of Case 3. For the very small plant with only one or two furnaces, lacking a competent mechanical force to supervise a gas compressor, it is often advisable to recommend Case 1, locating the simple and rugged turbo-compressor near the furnaces. For that large range of plants in between, the industrial gas engineer can only use his own judgment. After all, it is the possession of this judgment or common sense mixed with a background of technical knowledge that makes him an industrial engineer.

1937 Industrial and Commercial Gas Consumption at Record High

The amount of gas used in industry and commerce has been at an all time peak for two years and considerably above the pre-depression years. According to Hale A. Clark, Chairman of the Industrial Gas Section, American Gas Association figures show that for the year 1937, the gas utilities sold 1,090,310,000,000 cu. ft. of industrial and commercial gas. These figures, which include both manufactured and natural gas, disclose a gain of 10 per cent over the preceding 12 month period or double the rate of increase in industrial production and commercial activity as reported by the Federal Reserve Bank.

While this reflects, in part, a high rate of industrial production throughout the country, a great portion of this gain is due to other causes. Economical and flexible gas is replacing other fuels to a large extent. This is due, in part, to the material savings effected by the use of gas because of its several inherent advantages.

One outstanding feature is that gas has made bigger strides than industry for a number of years. The philosophy by which industry has made such rapid progress in recent years, is to give constantly better value at lower prices. The record shows that the gas industry, in its service to all industry and commerce has more than kept pace with this philosophy of progress. Industrial and commercial gas customers, back in 1929, amounted to 452,000 but the records show that today they total 1,017,000.

A.G.A.E.M. Discusses Market Trends

Market trends and statistics affecting the industry were reviewed on January 25 at a meeting of the directors of the Association of Gas Appliance and Equipment Manufacturers at the national headquarters, 60 East 42nd Street, New York. Merrill N. Davis, president of the Association, and executive vice-president of the S. R. Dresser Manufacturing Co., Bradford, Pa., presided.

A detailed study covering participation by gas appliance and equipment manufacturers in the New York 1939 World's Fair was presented. Other matters included a report on promotion activities in connection with sales contests being sponsored by divisions of the Association, past and future laboratory activities and the applications of several manufacturers for membership.

Pipe Corrosion & Coatings

Shields and Primers

By Erick Larson

Part 20

Porosity

THE toleration of porosity in a shield depends upon the effect produced by moisture. A much greater porosity is permissible in a shield than in the water-proofing material. A large percentage of the moisture absorbed by some protectants may penetrate only to the inner surface of the shield.

Wrappers may lose tensile strength from water absorption. The absorption of water frequently causes an unbonded wrapper to lose much of its ability to withstand the destructive forces to which it is subject after burial. However, bonded wrappers removed from submerged lines and possessing only one-third the tensile strength of new material, were serving their purpose adequately. The presence of moisture in a wrapper would indicate an insufficiency of impregnating material or lack of complete sealing of all parts of the basic wrapper material.

Some wrappers contain a binding material which is soluble. The loss of this small quantity of binder does not ordinarily result in disintegration of the wrapper. However, the loss of a part or the whole of the binding material would increase the porosity of the wrapper. The greater the porosity the greater the probability of the wrapper disintegrating.

The fine pores in some wrapping materials result in a gradual capillary action which may finally cause disintegration or decomposition.

The most desirable material for a wrapper is one which is itself non-porous and impregnated with a water-proofing material which merely fills the voids between the wrapper particles. This ideal is seldom practically obtainable and, therefore, the fillers or impregnating materials must be capable of penetrating the small pores in the wrapping material as well as fill the voids.

Absorption

The absorption of liquids by certain types of coatings produces swelling and gradual destruction of the material insofar as its corrosive resisting ability is concerned. The ends of the threads in some woven materials used in manufacturing wrappers may project beyond the water-proofing material or be exposed by cutting the wrapper. Capillary action and absorption produces a slow but nevertheless gradual saturation. Organic materials, particularly, lose their value as wrappers with saturation.

Adsorption

Adsorption is a factor on wrappers only during bonding. A material which has the power to adsorb considerable moisture on its surface would not bond properly due to the steam generated by contact with the hot coating. A porous material or one possessing an ability to absorb moisture would become saturated more rapidly if the surface were highly adsorptive. The practice of saturating or impregnating wrappers has minimized their adsorptive power.

Dielectric Strength

A wrapper is not required to possess dielectric strength as its function in corrosion mitigation is primarily to reinforce the structural strength of the protection, the component parts of which are considered as an integral structure. The wrapper impregnating material usually has dielectric characteristics identical or similar to the coating and therefore adds to the total electrical resistance. The basic wrapping material may also be insulating. However, the gradual increase in moisture content of practically all wrappers lowers the insulating value of the wrapper. The dielectric strength of the corrosion protection should therefore be determined without the wrapper whose insulating value may be considered as only temporary. A specification of coating dielectric strength should state that tests are to be conducted without wrappers.

Bacterial Resistance

Permanency of a shield depends, among other considerations, on its ability to resist the destructive action of bacteria and fungi. The common term of rotting applied to a wrapper has its scientific explanation in the decomposing effect of bacterial action or fungus growth although porosity and absorption are most frequently the vehicles of these destructive agents. Research has definately proven that metallic corrosion progresses in the absence of air when anerobic organisms are present. Destruction of wrappers may also occur in the presence of air through the action of aerobic organisms.

Two general divisions of wrappers are based upon the organic or inorganic nature of the material. Inorganic materials have an indeterminate life being independent of bacterial organisms. The organic materials have a comparatively short life in the presence of bacteria or some other types of living organisms. The life of the organic wrappers is therefore dependent upon the effectiveness of the seal produced by the impregnating material. The thinness of the seal produced by most impregnating materials provides little and therefore only temporary protection from biological, chemical or electro-chemical action. Protecting the wrapper by a layer of coating material applied to the external surface adds to the life of protection. However, even in such instances, the layer of wrapper nearest to the soil should preferably be composed of inorganic materials. The value of an additional layer of coating between the wrapper and soil as a protection for the wrapper depends upon the severity of the soil stress and to a lesser degree upon the eventual saturation of the coating.

The action of bacteria or fungi when directly in contact with a wrapper has been observed to be frequently different than when the shield is encased in a bitumen. Some wrappers have rotted rapidly when encased in asphalts which absorbed moisture while other organic types of shields had long lives when similarly protected. These latter types rotted quickly when directly exposed to the soil. These apparently contradictory experiences are mentioned to indicate the intensity with which research must be conducted to determine the true causes of some failures. In the instance cited a slight change in the basic wrapper material may have increased resistance to the particular bacteria present. A more complete sealing or water-proofing of the wrapper surface with the impregnating material may have been possible due to the surface variations in the different basic wrapping materials. Different treatments of the same material during manufacture of a wrapper may also materially alter the ability of the material to be properly impregnated or change the surface of the wrapper to such an extent as to decrease the strength of the bond possible between basic wrapper and the impregnation materials.

The products of disintegration particularly of rag felts may be highly corrosive and therefore the bacteria may only be indirectly responsible for an increase in the rates of corrosion.

The specific bacteria or fungi which cause organic shields to decompose has not been a subject of intensive or extensive study. However, the failure of wrapped lines from such action prompted a desire for an accelerated test. Mr. G. E. Whitwell of Bay Shore, N. Y., suggested the submersion of shield samples in domestic sewage. He mentioned that, "we have no definite idea as to what specific kind of bacteria exist in the cesspools beyond the B-coli group, the arogenes and the aerobic and anaerobic types besides presumably liquefiers and possibly yeast. Regarding the statements of other people concerning the effect of bacteria on wrappers of the paper or cotton cloth type no mention was made as to the effect of specific conditions such as acid or anti-acid solutions, salt water and hydrogen-sulphide bearing waters on the potency of bacteria which are destructive to bacteria. It is known that proper conditions of acid solutions, absence or presence of air, absence or presence of moisture are necessary for the maintenance of specific bacteria life."

To check the effect of bacteria on wrappers Mr. Whitwell suspended samples in a cesspool used for kitchen, toilet and bathroom waste. After a month and a half, an examination disclosed the following facts. The Kraft paper, "was found to have been badly liquefied and consequently quite weak." A petrolatum impregnated wrapper originally grey, "had lost its color and become black or almost tarry in appearance. It is more pliable than heretofore yet it is just as strong. It tore more easily. There was no apparent disintegration of the fibres of the wrapper."

Reporting on the condition of a tar and asphalt impregnated asbestos wrapper, Mr. Whitwell stated, "the asphalt impregnated wrapper apparently suffered no ill effects, being in excellent condition at the time of the inspection. The tar impregnated wrapper had lost its jet-black color, becoming an ash grey. The dried sample was much more brittle than the original."

Longer tests resulted in finding only the wires to which the few organic wrappers had been attached. The asbestos wrappers had become more discolored and weakened but remained structurally intact. While these few samples are indicative of what may be expected in some field conditions the test is unusually severe and field tests should be more extensively conducted before general conclusions may be formed. The tests, however, do support the practice of using only inorganic shields.

The inclusion in coatings of materials toxic to living organisms has been mentioned previously. The idea was extended to materials used for impregnating wrappers. The use of creosote, tar or other compounds toxic to bacteria and fungi while slightly delaying decomposition from such causes was not of sufficient value to be considered as a practical development.

Organisms may not be the direct cause of corrosion protection deterioration but the products resulting from the propagation and decomposition of such organisms may be the direct cause.

The definite and sound trend in corrosion protection is to use only inorganic shields.

Impregnation

Many of the shield requirements mentioned are improved or secured by saturating and coating the shield with a proper material. The material used to impregnate a wrapper is usually a slightly modified form of the coating. Fluidity of an impregnating mateal is important to obtain saturation. This characteristic is partially ob-

Fig. 1. Unloading 6" pipe. Ends have protection cutback and primer must act as a temporary protection against atmospheric corrosion.

tained by excluding the filler used in the coating material and possibly adding a flux. Inclusion of a liquid flux having a low surface tension in the impregnating material will permit penetration into the minute pores of the basic shield material thus aiding in the ejection and exclusion of moisture.

The strength of some wrappers is slightly decreased by the impregnating material but with proper selection the effect will be insufficient to impair its usefulness as a shield. Some shields are strengthened by impregnation but frequently at the sacrifice of ductility. Ductility within limits would be of greater importance than strength of wrappers and, therefore, ductility would be the factor limiting or determining the quantity of impregnating material.

In general practice all flexible shields whether of organic or inorganic material are impregnated if possible. Those which cannot be impregnated usually have an extra layer of coating material applied to the outer surface. The uniformity of saturation may frequently be determined by weighing representative samples of the shield material and comparing the unit weights. Thoroughness of saturation must be determined originally by visual inspection or microscopic examination. The impregnating material should seal both surfaces of the shield. The thickness of the surface layer is necessarily

small but is of importance in sealing the ends of any capillary tubes.

The surfaces of the impregnating shield should be of a character which will permit a good bond and not be tacky or oily.

Kraft Paper

Kraft paper is a brown wrapping paper frequently applied to the exterior surface of a corrosion protectant for such purposes as appearance, to facilitate handling, prevent damage from friction or abrasion, advertisement, reduce absorption of solar heat and to increase the ease of detecting areas of possible damage.

Kraft paper possesses practically none of the qualities essential for corrosion protection and therefore does not directly contribute to the life of coated paper. The fact that Kraft paper has been found intact in a few locations after long periods of burial does not indicate its value as a protection but rather the lack of destructive agents in the soil. Where Kraft paper exposed to soils has been found to remain intact for long periods, unprotected pipe will usually last indefinitely. Such uncorrosive areas are limited in extent.

There has been an opinion expressed that heavy Kraft paper aids in preventing soil stress. The theory is that the soil stress caused by the settling of a trench occurs mostly in the first year following burial. The Kraft paper is viewed as preventing adhesion of the soil to the coating thus reducing the effect of soil stress. This theory is presented because of its possibilities which warrant more general investigation.

Fig. 2. Mill wrapped pipe with protection extending to the end, affording protection against atmospheric corrosion during storage.

Instances have been reported of cracks occurring in coatings along Kraft paper seams. This cracking may be caused by a decrease in the coating thickness due to the tension on the Kraft paper during application. The thin layer is more apt to crack than the thicker portions of the coating when the pipe is bent for any reason. Specifications may include the requirement that the tension on Kraft paper during application be no more than one-half that on wrappers as the bond strength is relatively unimportant. A tension just sufficient to provide a gluing action of the Kraft paper to the protection is all that is essential to prevent tearing from abrasion. While Kraft paper has a large coefficient of expansion and contraction compared to the coating of pipe, the strength of the ordinarily used weights of paper is not sufficient to prevent tearing should contraction occur. The spiral wrapping of the Kraft would cause any contraction to produce a tearing action rather than a direct pull sufficient in strength to crack the coating.

Primers

Definition

Pipe coating primers are the materials applied to metallic pipe surfaces to act as the bonding agent between the metal and coating. The materials comprising the primer cannot be exactly defined unless the specifications of the coating are known as at present each coating requires a different primer to produce the most effective bond. As a general rule the primer is a solution of the coating without any filler. This general definition is frequently modified, at least slightly, as less ingredients are incorporated in a primer than in a coating.

Purpose

The definition states that the purpose of a primer is to act as a bonding agent. Practical considerations have necessitated the extension of the purpose so that the primer acts as a temporary preventative of atmospheric corrosion. The ideal procedure is to prime the pipe immediately after cleaning and coat as soon as the primer is in proper condition or "set" or "cured" as the action is frequently termed. This is practically obtainable only when application is accomplished at the pipe mill or at a central station. The use of a primer as a temporary preventative of atmospheric corrosion presents many disadvantages which will be mentioned in detail later and this practice has been a frequent cause of protection failure usually improperly attributed to the materials.

Necessity

The ideal coating would possess among other desirable characteristics the ability to adhere to a metal surface without any bonding medium being necessary. The most commonly used coatings are those which are applied when hot and such protectants do not readily bond themselves to metal at ordinary temperatures. When the metal is heated to a temperature approaching that at which the coating is applied a satisfactory bond may be produced. However heating of the pipe retards the cooling of the coating and the resulting protection is undesirably thin. Heating the pipe to secure a bond and applying an additional layer of coating is considered less practical than brushing on a priming coat. The necessity for a primer results from the use of such a material being the most practical method known at present for producing a bond.

The reason for the lack of bond, when a hot applied coating is applied directly to the metal, is usually conceded as due to the rapidity of chilling at the pipe surface. Apparently time is required for a liquid to thoroughly cover every minute area on the surface of metal. The rapid hardening of the coating also produces contraction which would break the bond with the metal unless a flexible medium such as the primer is present between the two other materials. The adverse effect of foreign materials, especially slight amounts of moisture, on the bond is less when a primer is used.

Cold applied coatings seldom require a primer except in a few instances where a coating must be baked or annealed subsequent to application.

Limitations

The absence of an ideal coating which would not require a primer has resulted in considerable investigation of the many materials used for priming with the object

"NO EXCEPTIONS! EVERY JOINT ON A DRESSER-COUPLED LINE HAS A MADE-TO-ORDER, PREDETERMINED STRENGTH"

You may order your Dresser Couplings for any working pressure you need, and know that every one of them will be identical in strength. And this strength will be scientifically and accurately predetermined by mathematical formula. That's because Dressers are assembled from standardized, precision-made parts—the strength of which can be varied to suit the specified working pressure.

Note to Reader:
This is the eleventh in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin No. 351.

S. R. DRESSER
MFG. COMPANY, BRADFORD, PA.
In Canada: Dresser Mfg. Company, Ltd., 60 Front St., West, Toronto, Ont.

of producing a single universally applicable mixture. To date no single material even remotely approaches the ideal. Primers therefore, have closely defined limits as to their bonding value and each must be used under the specific conditions for which they were developed. Experience has been the most important factor in primer development. Therefore, generally applicable facts are rather difficult to ascertain in the present state of primer development.

Bond

A primer produces a permanent bond to the pipe because of its dual ability to penetrate into even the most minute of pores or cracks in the metal surface and also adhere to all smooth parts of the surface. A primer having a low surface tension would have an advantage over those of a higher value in meeting these requirements. The low surface tension is ordinarily due to the vehicle used and would be lost with the evaporation or oxidation of the vehicle. Therefore, the basic priming material itself must possess the ability to adhere to the surfaces to which it was carried and evenly dispersed by the vehicle.

Manufacturers of coatings have realized the extreme importance of bond in producing an effective protection against corrosion. Therefore, the manufacturers have conducted extensive research particularly on the proper composition of a primer for their specific type of coating. The laboratory tests to determine the bonding value of a primer carefully control the condition of the pipe surface, the method and procedure followed in applying the primer, the curing or drying time, the time interval between completion of curing and coating application and the foreign material present on the primer surface. These conditions all pertain to application procedure-control and will be discussed in detail when application is being considered. However they are mentioned here to indicate that the fundamentals of bonding by means of primers has been intensively investigated particularly through examination of actual field installation and the variables are both known and controllable. However, the factors enumerated indicate that the human element is of much more relative importance than the composition of the material. A manufacturer ordinarily provides more intensive supervision, more scientific control and more complete inspection of primer composition and production than can be exercised over the application of a primer and coating. While there is a greater possibility of any bond failure being caused by lack of proper application or use experience has demonstrated a generally high value of bond in practice. The nature of the proper procedure control is such that a high degree of skilled attention is not necessary. Ordinary care by the average laborer who has been given a brief training will produce a bond with a strength known to be possible by tests conducted under laboratory conditions.

The bonding of a primer to the coating depends upon the degree to which the primer is absorbed by the coating. A bond of the surfaces of primer and coating only does not provide sufficient adhesion and therefore is to be avoided. The proper blending of the two materials depends upon the ingredients, temperature, state of primer surface, age of primer and method of application. These conditions pertain to hot applied coatings.

The variation of bond strength with differences between the basic ingredients of the coating and primers is the subject of considerable interest and some present research. It has been determined from experience that generally the use of the same basic materials in both the primer and coating produces a better bond than the use of different basic ingredients. For instance when the hot applied coating is a tar base the primer should also be a tar compound.

The character of the vehicle used and the method by which the primer is cured are important factors in the production of a bond. The vehicle used is ordinarily one of the lighter distillates produced during the manufacture of the coating. The primer is usually a mixture of certain of the distillates secured in coating manufacture but in different proportions than the coating. The same material used as a vehicle is frequently used as a flux for coatings to provide the proper characteristics for application during low atmospheric temperatures. Vehicles and also primers commonly used in paints applied to resist atmospheric corrosion have been tried as a base for pipe coatings but without success to date. The vehicles used for atmospheric corrosion resisting paints most frequently dry by oxidation rather than by evaporation. Oxidation is a slower process than evaporation. Therefore, for pipe coating primers the vehicle must be of the evaporating type so that drying occurs in a few hours rather than the days required for vehicles such as linseed oil. Turpentine used as a thinner for paints may be somewhat compared with the flux and primer vehicles used in pipe coating.

Fig. 3. Pipe on which a tar base primer had been applied at mill. A number of lengths were stored in a triangular pile from April 15th until this picture was taken on June 18th during which time the pipe was exposed. A few of the top pieces were removed from the left part of the pile. Note the streaked appearance of the pipe on the right which has corroded where exposed to the solar rays. The excellent condition of the pipe not exposed to the solar rays is indicated by the uniformity of appearance.

The melting temperatures of the primer when properly cured should be below that of the application temperature of the coating so that at least the primer surface will melt sufficiently to cause fusion.

The state of primer surface has an effect on the fusion between primer and coating. When the primer surface has become coated with foreign substances the foreign particles may act as fillers do with coatings particularly the effect of raising the melting point. The foreign material may also cause a plane of demarcation

(Concluded on page 58)

The Burning of Gas Under Pressure

By
J. G. Coutant
Consulting Engineer

THE living always find something new—in live industries the same is true; a practical example of this continuity is found in the gas industry, where the burning of gas under a substantial pressure, together with an increased mass flow over and inside the heat absorbing surfaces, has produced such results as to give to the gaseous fuels new evaluations, on a par with other fuels used for industrial heating and for power generation which gain broadens the field of application for gas firing.

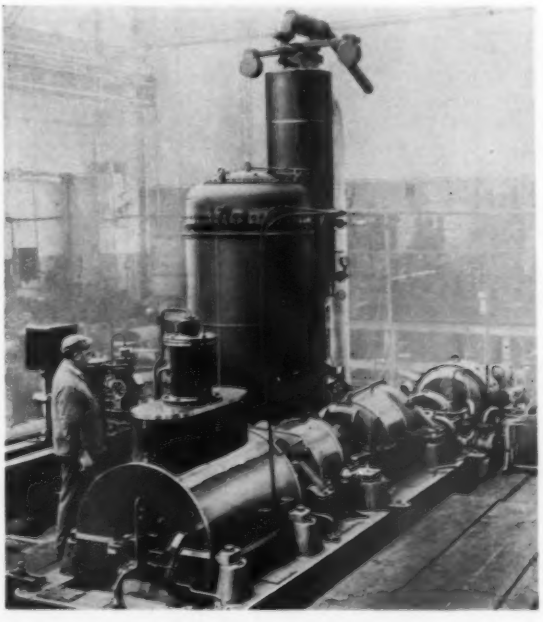
During recent years much attention has been given to the additional areas of heat absorbing surfaces, both direct and indirect, to be placed in smaller space for reducing structural expense and for the improvement of thermal efficiencies. These are installed as water-walls and superheaters in boiler furnaces and in flues, while some have included the forced circulation of water through small tubes in order to pack more surface into a given space at lower cost.

Until the Velox Steam Generator came into existence about five years ago, it seems that very little had been accomplished toward increasing the area of the heat emitting mass, and the radiant surfaces, at the same time increasing the rate of fuel burning in a smaller space so as to supply this demand for heat, and thus effectively lower costs.

Indeed it seems logical to name steam producers "boilers" because their chief function is that of boiling water. Natural circulation by steam bubbles is depended on to carry away the heat, as in the tea kettle.

Process of Pressure Combustion:

This apparatus burns fuel gas under pressure and thus increases the density of the fuel burning particles and the total area of the heat emitting surfaces within a given unit of space. Added to this is the mechanical heat in the compressed burning products. The effect is to increase the flame temperature and shorten the distance from particle to particle, or the distance of flame travel. Consequently the velocity of combustion is increased and more fuel can be burned in a given space. By this process of combustion fuels have been burned at the rate of 1,000,000 Btu. per cu. ft. per hour while the radiant heat transfer within the furnace has attained a rate of 100,000 Btu. per sq. ft. per hour.



Velox Steam Generator for Blast Furnace Gas on the test-bed. Velox boilers fired with blast furnace gas have two blowers, one for gas and one air. The mixture of gas and air only takes place directly in front of the burner. The axial thrust of the blowers is balanced by the opposed arrangement. The gas turbine is double-ended.

Velox boilers fired with blast furnace gas can also be run on oil. In this case both blowers are used for compressing air.

The fundamental principles back of this development are not known well enough to permit one to express them in these few lines, so a few examples may serve to impress one more than just precepts. Fifty Velox Steam Generators are in use burning fuel under pressure combustion, with a total steam output capacity of 2,821,000 lbs. per hour. The thermal efficiencies are higher than attained in a modern steam power station, and are maintained over a wider range of fluctuating loads, or say from one-third to overload capacity at approximately 87 per cent based on the high calorific value of the fuel (U.S. practice). The units for a given output are small in size and weight and have relatively small heat absorbing surface. They need about one-quarter the building space and foundation and are installed as easily as a machine.

They are particularly adapted for gaseous fuels which have the following calorific values and flame temperatures:

Gas	*Calorific Value Btu. per Cu. Ft.*	*Theoretical Flame Temperature° F.*
Natural	1,000	3,400
Manufactured .	500	3,340
Coke Oven ...	500	3,337
Producer	130	2,831
Blast Furnace .	90	2,112

To Natural Gas Companies throughout the United States, it may be of considerable interest to know that this fuel is being burned under pressure at high thermal economy at the Ocna Muresului Power Station, at Bucharest, Rumania, using a Velox Steam Generator, since 1935. The unit has a capacity of 39,500-lbs. of steam per hour, at 515-lbs. per sq. in. absolute pressure, with a total steam temperature of 752°F. and 176°F. feed water. A duplicate unit was ordered in 1936. These supply steam to turbo generators for the chemical works of the S. A. a Uzinelor Solvay din Romana.

Another unit burning natural gas under pressure having a capacity of 20,000-lbs. of steam per hour, at 343-lbs. per sq. in. absolute pressure, 750°F. total steam and 140°F. feed water temperature is in use at the

Dombovitza Cement Mill at Fieni, Rumania.

In order to picture the economic burning and practical operation attention is drawn to the installation shown in photograph of the Societe Metallurgique de Normandie, at Mondeville, France. Here blast furnace gas is burned with results that rival other fuels used in the steel industry, while burning richer gases such as coke oven gas the net thermal efficiencies are 2 per cent higher.

The Gas Burning Steam Generating Machine includes:—

	Heating Surface
1. Boiler and Combustion Chamber	392 sq. ft.
2. Compressor for Blast Furnace Gas.	
3. Compressor for Combustion Air.	
4. Gas Turbine for Driving the Compressors.	
5. Motor for Starting and for Make Up Power.	
6. Steam Superheater (not seen)	538 sq. ft.
7. Economizer (not seen)	1,592 sq. ft.
8. Feed Pump.	
9. Boiler Water Circulating Pump (not seen)	
Furnace Volume 105.8 Cu. Ft.	
Total	2,522 sq. ft.
Rated Capacity: Steam Output per Hour	37,500-lbs.
Boiler Evaporation per sq. ft. per Hour	95.5-lbs.
Unit Evaporation per sq. ft. per Hour	14.8-lbs.

Practicability:

This plant was put into service in August, 1933, and has been in almost continuous operation since that time. Up to February, 1937, it had 16,000 service hours. The unit works day and night, but is shut down every 60 days for renewal of parts, probably in connection with the gas compressor due to erosion of dust, and particularly for clearing the accumulated solids from the combustion chamber.

Acceptance tests for the gas burning steam generating machine were made January 25, 1934.

This remarkable performance was accomplished with an investment lower than that required for a blast furnace gas and powdered coal combination fired plant. It will be seen that the equipment is radical in design, and this feature may retard its general adoption until engineers become acquainted with the application of pressure combustion and the effective heat transfer due to increased mass flow over and inside the surfaces, together with greater

Testing Authorities	Mondeville Power Station, France by Ste. Metallurgique de Normandie			
TESTS	1.	2.	3.	4.
Load	*Full*	*Full*	*Full*	*Full*
Fuel	*Blast Fur. Gas*	*Blast Fur. Gas*	*Blast Fur. Gas*	*Blast Fur. Gas*
Fuel Consumption per hour	25,977-lb.	26,163-lbs.	25,015-lbs.	26,036-lbs.
Exit Gas Temperatures from the economizer	234°F.	226°F.	237°F.	241°F.
Steam Generated per hour	24,876-lbs.	25,758-lbs.	24,098-lbs.	24,459-lbs.
Steam Pressure Abs. per sq. in.	203-lbs.	207-lbs.	203-lbs.	208-lbs.
Steam Temperature from Sup'Ht.	793°F.	782°F.	786°F.	813°F.
Feed Water Inlet Temperature	96°F.	87°F.	104°F.	106°F.
Power for auxiliary machines:				
(5) Input to Motor for make-up	118.5-Kw.	123-Kw.	133.5-Kw.	116.75-Kw.
(5-8-9) Total Plant Aux. Power	155.23-Kw.	159.87-Kw.	171.07-Kw.	154.14-Kw.
Electrical power was deducted at about 15,800 Btu. per Kw.				
Net Plant Efficiency (H.C.F.)	85.5%	86%	83%	82.4%

fuel burning rates per unit of space with higher temperatures due to added mechanical heat.

For comparison — A gas-engine plant with six engines of 3,500 Kw. capacity each two 5000 Kw. turbo-generators can be replaced by two Velox Steam Generators and a steam turbine of 30,000 Kw. output. This would take the same space as that occupied by one of the gas engines. Such a steam plant because of its high efficiency at all loads, can advantageously compete with gas engines on a thermal basis assuming steam pressures around 600 lbs. per sq. inch and steam temperatures of 800°F. The initial cost and operating costs would then be much less.

Field of Usefulness

It would seem that other light-weight steam generators: La Mont Boiler, and the Steamotive in adopting a similar process of combustion with automatic regulation would find a ready market in gas fired steam-electric stations which need stand-by units. All are designed, and built with a small amount of material to effect the transmission of heat, and with an extremely small water storage capacity with uniform metal sections enabling the units to be put into immediate service. Such light-weight steam generators can be brought to full load condition in say 5 minutes from a cold state. The same applies to load variations, which are so rapidly dealt with by the automatic governing systems that variations from half to full load and back again take place in a few seconds.

To complete the stand-by unit, light weight turbines of the double-rotation radial-flow type built especially for sudden drop or pick-up of loads should be included. The metal parts of both steam generators and turbines for a given size are comparatively small and symmetrical in nature. Therefore, in so far as expansion, contraction and momentum are concerned, they do not suffer ill effects when subjected to sudden temperature changes when bringing the unit up to full capacity from cold state.

A 50,000 Kw. turbine at Vasteras, Sweden, has been brought up to full power from cold state within 9 minutes. This starting time includes that necessary for the auxiliary equipment. The turbine can be brought up to full-speed operation in two minutes from the time the vacuum is attained.

Handbook On Eye Hazards

To secure wider distribution of its book on "Eye Hazards in Industrial Occupations" by Louis Resnick and Lewis H. Carris, the National Society for the Prevention of Blindness is now offering copies at the special price of 50 cents each as long as the supply lasts. This book, which sold formerly at the actual cost price of $1.50, was published in 1924. Although some of the photographs show safety devices which have since been improved upon, the contents remain a valuable guide to safe practices in industry.

"Eye Hazards in Industrial Occupations" is a handbook for safety engineers, safety inspectors, safety committeemen, industrial physicians and nurses; for those responsible for industrial operations.

The volume contains 247 pages, and includes 59 illustrations dealing with the safeguarding of eyesight in factories, mines, shops and offices. Orders or inquiries concerning this volume should be addressed to the National Society for the Prevention of Blindness, 50 West 50th Street, New York City.

Getting Together for Sales

By

Alexander Forward

Managing Director American Gas Association

IT is not easy to realize that nearly twelve years have passed since I broached the subject of gas company and the plumber dealer cooperation in an address before the Annual Conference of Presidents and Secretaries of Master Plumbers Associations. It is almost as hard to realize that it has been nearly seven years since the cooperative agreement was executed between the National Association of Master Plumbers and the American Gas Association. Certainly it is time to take stock, to look around and appraise what has happened in the meantime and take counsel together to see what we can now do in the direction expressed in the title given my talk, "Getting Together for Sales."

During the years since May 2, 1931 there has come to the American Gas Association no suggestion for any change in the agreement then entered into with enthusiasm and good faith. Recent reconsideration indicates that the principles then laid down and agreed to are just as good in 1938.

It has not been found possible, nor indeed is it desirable, to outline a set of practices applicable generally to the relations between the gas companies and the plumber-dealers. Local conditions vary; local practices concerning public relations and customer relations and employees relations are substantially different.

As a sort of constitution, the principles suggested in 1931 for the guidance for the gas companies as a basis for promoting cooperative trade relations, have been demonstrated to be sound and constructive. They have worked. Practices have been wisely left to the localities. In most cases they have worked too.

I make no apology for taking the time to read these principles here. It is good for all of us to be reminded at times. Here they are:

Agreement of May 3, 1931

1 All gas appliances offered for sale by all cooperating agencies in a cooperative program shall be of any standard make or shall bear the seal of approval of the American Gas Association Testing Laboratory.

2. No appliance or merchandise not directly related to the use of gas shall be sold by gas utilities.

3. In all merchandising activities, the resale mark-up of all gas appliances that have received reasonable customer acceptance shall be consistent with present-day merchandising practices. There shall be no premiums given with nor trade-in allowances made in connection with the sale of any such appliances unless all cooperating agencies are in a position to participate.

4. The presenting to the public of those gas appliances not having received reasonable customer acceptance shall be considered as promotional activities and not as merchandising activities.

5. Coordinated advertising of approved appliances should be developed by gas utility companies and local dealers, and the gas company should give all reasonable assistance possible to the dealer in advertising, displays and sales assistance.

6. The deferred payment feature of our merchandising activities shall be on an economically sound basis.

ALEXANDER FORWARD

And while I am digging up history and telling you I think we all did a darn good job in those days, let me remark that what I said in 1927 in an article in Domestic Engineering is also just as good now as it was then:

"The wide-awake gas man numbers among his closest business friends the local plumbing and heating contractors, for they have too much in common to permit anything but the best of relations. Consider for a moment the question of water heating. The manufacturers have provided equipment for every need, whether it be a small circulating heater, an automatic storage or an automatic instantaneous system. The local gas company has intimate and detailed knowledge of its own distribution system and how the water heating load will affect the system as a whole. Under a good cooperative working agreement between the local gas company and the local plumbing and heating contractor the physical conditions prevailing at the customer's location will be previously discussed and the most desirable appliance or equipment installed. The net result will be that the new customer will obtain uniform and satisfactory water heating without affecting his neighbors, nor they him, even in small-main outlying districts.

"The gas company has constant and continuous contact with its customers and must stand prepared to render service long after the plumber or contractor has completed the job. In the interest of good and continued service and satisfaction, only the proper installation should be made for a given situation. The means for securing and maintaining such contact between the gas company and plumbing and heating contractor are readily available and tend to promote harmonious relations.

* * *

"The plumbing and heating contractor is engaged in the business of merchandising his knowledge and service, together with appliances and equipment for many uses beside gas burning. The gas company is primarily in the business of merchandising gas. It is uneconomic and entirely unnecessary that these two complementary agents for rendering the most essential, as well as the most convenient and comfort-giving service to mankind, should not be in the closest and most harmonious accord.

"We believe this increased business will result from furnishing the gas consumer with the safest appliances, the best in their respective field, the most economical in operation and correctly installed to render the maximum possible service."

Many of the interests of the gas company may be one thing and many of the interests of the master plumbers may be another thing. But there is one desire we have in common and nobody here will deny it. We want more business and with more business we would like to make more money. That is the incentive of the entire picture from the one-plumber

From address delivered to Illinois Master Plumbers Association, Springfield, Ill., January 18, 1938.

shop to the corporation with a million meters.

It is essential for the gas company to keep in mind the plumber is in business for profit and for the plumber to remember that the gas company is in no sense a monoply but is in competition with every other form of fuel.

In many cities and towns these interests have set together around the table or have participated in meetings where cooperation has been discussed. The Plumbing and Heating Trade Journal for December has some striking stories of the results of dealer cooperation. You may recall the figures of a single concern, The Brooklyn Union Gas Company, whose sales through dealers increased from $77,000 in the last six months of 1929 to $1,029,049.85 in the year 1937, while the sales made through leads secured by dealers who profited by them, have risen from $12,000 to $193,323.32 in 1937, or a total appliance business of $1,222,373.17, an increase of 22.8% over the preceding year. In other words, in the territory of one company the cooperating dealers share in a yearly business of $1,000,000. The tendency there is for the plumbers to do actual selling themselves instead of furnishing leads.

Mr. Hugh Cuthrell, Chairman of our Commercial Section, tells in his article in the current issue of *American Gas Journal* of one plumber in his Brooklyn territory, who in the first ten months of 1937 collected 228,962 accounts, sold 222 appliances worth about $25,000, made 362 appliance connections and executed 20,763 service orders. He made $10,000 in commissions and connection charges.

I have said that no request has come from anywhere within the gas industry for any change in the cooperative agreements. It is equally true that we have had no request in these seven years for any such action from the National Association or from any state or local Association of Master Plumbers. The American Gas Association stands ready to confer with any responsible body of master plumbers at any time. Come and see us and we will talk things over.

As a matter of fact, there will be a conference of sub-committees of our respective organizations in New York on January 27, next week, to discuss matters of joint interest.

You may recall that in a survey after two years of development work under the cooperative plan it was found that operating gas companies serving seven million customers were conducting their sales activities in accordance with the joint recommendations. It is interesting to note that 95% of the manufactured gas companies and 96% of the natural gas companies cooperated with plumbers and a lesser percentage with heating contractors, furniture stores, hardware stores and department stores.

The field of the master plumber today is distinctively gas water heating. Now see what is happening. You are all familiar with the prize contests for water heater sales. We recently asked the gas companies for lists of cooperating master plumbers to whom the literature of the contest can be mailed. We have received 12,000 such names and the addresses in just a brief period. Many more will be enrolled in the immediate future. Remember that these are master plumbers in close and friendly contact with gas companies and engaged in joint efforts for more sales and more profits.

There is money in the gas water heater business for the plumber. There is money in the same business for the gas company, which always wants to increase its gas sales. In three years there was an increase of 147% in the revenue of plumber-dealers from commissions and installation charges.

As expressed by our committee, cooperation is not a one-way ticket. These results could not have been achieved or even approximated except where the plumber-dealer was big enough and wise enough and forceful enough to take advantage of his opportunities and cooperative enough to work with the gas companies to their mutual profit.

I am not convinced that in any city or town in the United States or Canada is it necessary for gas companies and independent dealers to be competitors, except to the extent that healthy, open, honorable rivalry is good for all concerned.

Certainly legislation cannot be the cure. In the very few instances where utilities have been prohibited from engaging in the sale of appliances, it is history that the dealers, when deprived of the promotional efforts of the gas company, have suffered losses in business and usually join in a movement to restore to the utility its merchandising privileges and opportunities.

Our Association's latest activity is the organization at our Headquarters of the Home Appliance Planning Bureau. The purpose is to promote the construction of many new homes throughout the country, to encourage the sale and installation therein of the best modern types of appliances and to foster improvements to homes already occupied with modernization of "four-way gas equipment," ranges, water heaters, house heating and refrigeration. In connection with this activity there will be nation-wide architects' contests and builders' contests. We have planned the most extensive publicity and promotional work and there can be no doubt that this undertaking will put gas to the forefront in the American conception of the modern home and what it means.

It is totally unnecessary for me to say that this contains a direct appeal to every master plumber to keep fully acquainted with these activities on the part of local architects and builders and be on the job.

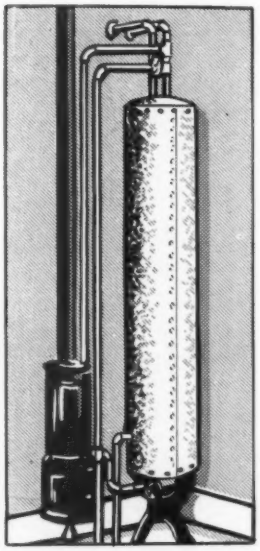
The gas companies want the help of the master plumbers and dealers. We want more appliances in use; we want better appliances in use; we want to sell more gas. As a special issue of your trade journal, I have already quoted puts it, the utilities "have found it extremely helpful to have so many master plumbers acting as sales ambassadors for gas." It is my hope that I have said something to show that genuine cooperative effort will make money for you, too.

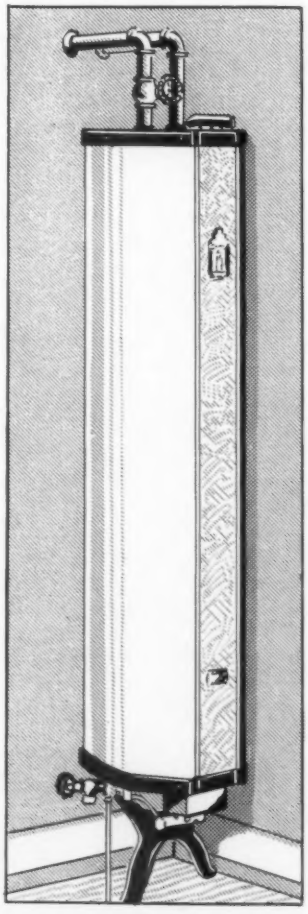
Industrial Men Will Discuss Subjects of Vital Interest

Exceptionally Strong Program for Pittsburgh Conference

The gas industry is eagerly looking forward to the annual A.G.A. Industrial Gas Sales Conference to be held at the William Penn Hotel, Pittsburgh, March 7 and 8, 1938. An exceptionally strong program has been arranged and many papers of vital interest to both manufactured and natural gas men will be delivered. Hale A. Clark, Detroit City Gas Co., is Chairman of the Industrial Gas Section.

Among the subjects that will be covered either by papers or symposiums are the following: soft metals, kilns, nonferrous furnaces, food manufacturing, temperature controls, propane and butane competition, forging and glass melting. Careful attention is being given to the development of these subjects by men who are well known and who are authorities in their respective fields. Another feature will be the Industrial Gas Men's Luncheon which will be addressed by a prominent speaker. A large attendance of both manufactured and natural gas men is expected and they will undoubtedly carry away with them much information and data of value to them in their everyday work.





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Automatic Gas Heaters Minimize Spring Failure

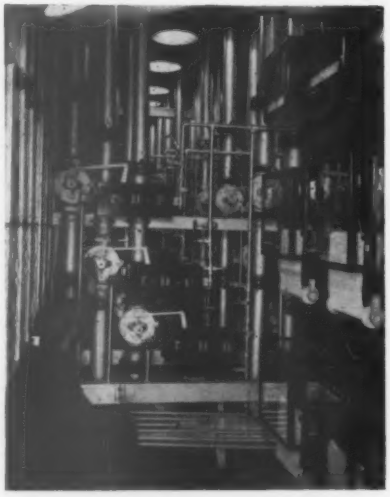
Heating for Pointing, Coiling and Proper Grain Structure Accomplished In Mechanical Gas Furnaces at Chevrolet Plant

By
J. B. Nealey
American Gas Association

THE traveling conveyor and controlled gas fuel have transformed the furnace into a heating machine, a dependable machine tool which is automatic as to temperature control and continuous in operation. Economical in use and flexible in operation such mechanical heaters are employed in forming and heat treating coil springs at the Chevrolet Forge Spring & Bumper Division of General Motors Corp., Detroit. Most Chevrolet coil springs, both outer and inner, are made from silico-manganese, S.A.E. 9260 steel rounds, hot rolled. Spring dependability is assured through precise control over every operation, starting with close inspection of raw material. Every new heat, and every different size round bar shipment from each heat is given an acid test for depth of decarburization as well as a hardenability test.

Four heating operations are necessary in the manufacture of the coil spring and automatic gas furnaces are used in each. First the ends of the steel bars are heated for pointing, second the stock is heated throughout its length for coiling, third the coils are reheated for hardening and again for tempering.

The bars which are 96¾ in. long, are first ground to size (0.702 in. in diameter) in centerless grinders and the depth of all decarburization is held to .008 in. in this operation. There are two rows of these grinders with a slat type conveyor between which carries the stock to a gas fired double end heating unit. This unit consists of twin slot type furnaces, located on a common base, so as to face each other. A traveling conveyor between carries the bars along with the ends of each protruding through the slots into the furnaces where they are heated. One of the furnaces is placed on slides so that the distance between the two can be adjusted to accommodate any length bar. Each furnace is about 8 ft. long and is heated with 4 gas burners on a single manifold. Both ends of the steel are pointed in one set of rolls.



Central control room showing closeup of automatic temperature control equipment with recording pyrometers. Pressure air is employed to inspirate gas for the furnace burners. The air lines to the individual sets of burners pass through the control room where they are equipped with motor driven valves actuated by potentiometers connected to thermocouples in the furnaces. The legend 7 D on the motor boxes means the draw furnace of #7 heat treating unit while the F, C, B stands for front zone burners, center zone burners and back zone burners respectively.

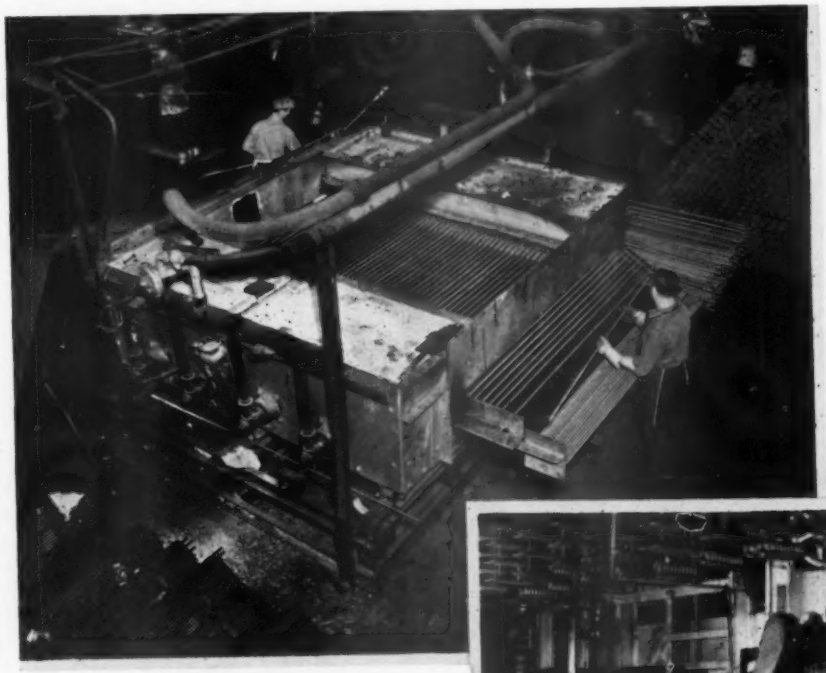
Furnace Performance Under Centralized Observation

By locating the temperature controllers, recording pyrometers, control valves, etc., in one central room these furnaces are always under the direct supervision of the chief metallurgist. This is accomplished by using the low pressure gas-air proportioning system, already mentioned, in conjunction with a single blower for pressure air and single valve control. This air is supplied at 1½ lb. pressure and inspirates the gas, which is dropped to atmospheric pressure, in any desired ratio. The air lines to the combustion system of the furnaces all run from the blower, through the central control room where they are provided with on and off valves actuated by the temperature controllers. These controllers are directly connected to the thermocouples in the furnaces and also to the recorders.

There are three gas furnaces of the continuous type for heating the pointed bars throughout their length for coiling. Two of these are of the walking beam type while the third is equipped with a mechanical pusher. The walking beam furnaces are 6 x 8 x 12′ long inside, and each has a capacity for heating 150 bars per hour. Heat is supplied by 8 tunnel type gas burners with one low pressure air-gas proportioning mixer per furnace. The gas burners on each furnace are provided with an automatic temperature control actuated by a single thermocouple located in the top arch near the center of the discharge end of the furnace. A time cycle of 22 min, is employed and the work is heated to 1700 deg. F.

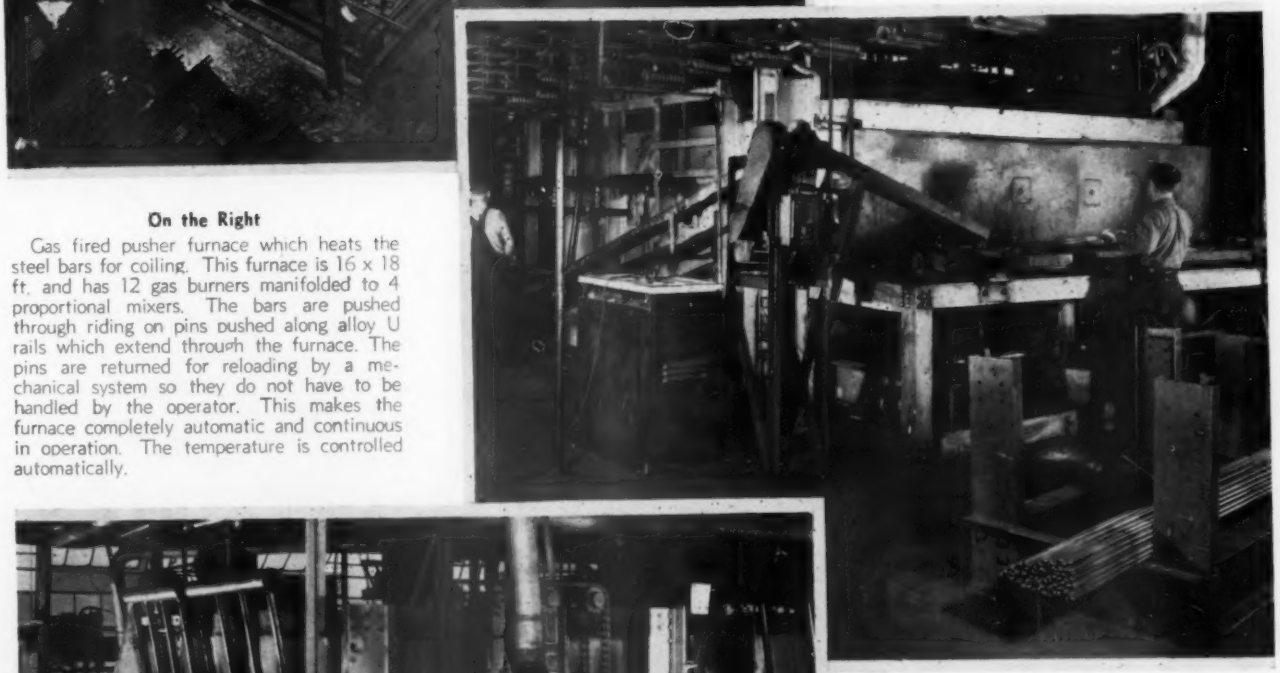
The third furnace, with a capacity for heating 300 bars per hour, is 16 ft. long, 7 ft. high and 18 ft. wide inside. It is provided with 12 gas burners and 4 proportional mixers The time cycle is the same as for the walking beam furnaces. The gas burners are divided between two automatic temperature controls which divides the heating chamber of the furnace into pre-heating and soaking zones. This furnace is equipped with alloy U rails in each of which rides a line of alloy pins. The work is loaded onto these pins which are pushed through by means of a mechanical pusher. A unique system by which the pins are mechanically returned for reloading consists primarily of a duplicate set of U rails just below the first. As the hot work

is discharged from the furnace the pins are pushed off the upper rails and drop into the lower, and a small mechanical pusher forces them back to the loading end of the furnace. A small elevator then lifts them from the lower to the level of the upper rails. Here they are reloaded and the main pusher forces them, together with their loads, onto the rails and through the furnace again.



On the Left

Twin, slot type gas furnaces with conveyor between carrying the steel bars. The ends of these bars are heated and operators (in background) force the hot ends into pointing machines. Note gas burners and combustion system on furnace in foreground. This assembly is movable on the base so that the distance between the furnaces can be adjusted to any length bar.



On the Right

Gas fired pusher furnace which heats the steel bars for coiling. This furnace is 16 x 18 ft. and has 12 gas burners manifolded to 4 proportional mixers. The bars are pushed through riding on pins pushed along alloy U rails which extend through the furnace. The pins are returned for reloading by a mechanical system so they do not have to be handled by the operator. This makes the furnace completely automatic and continuous in operation. The temperature is controlled automatically.

On the Left

Walking beam type furnace which heats steel bars for winding into coil springs. Equipped with 8 gas burners fed from one inspirator the temperature of this furnace is controlled from one thermocouple located in the top arch near the center of the discharge end. This provides even distribution of heat.

Automatic Hardening Furnace Fired With Gas

These three gas furnaces provide hot metal for six mechanical coilers. After the hot bars are coiled on a revolving mandrel the ends are broached square and the coiled springs, which weigh 10.6120 lbs. each, are then conveyed to the gas fired hardening furnace. This furnace has a capacity for 330 coil springs per hour and is 20 ft. long, 7 ft. 10 in. wide, and 4 ft. high inside. The work is taken through on an apron type conveyor.

The combustion system includes 22 gas burners with adjustable secondary air shutters and 6 low pressure inspirators. The furnace is zoned by three automatic temperature controls which maintain temperatures of 1550, 1550 and 1600 deg. F. respec-

tively. The work is in the furnace for 45 min. The quench machine for the hot coils has 12 heads, each containing a hydraulic press which closes the spring to the right length and plunges it into an oil bath.

The springs are now 10 in. long and 3½ in. in diameter. They are drawn in a gas fired furnace of the forced convection type. In size the furnace is 35¾ ft. x 7¾ ft. x 4 ft. inside and will treat 6000 lbs. of springs per hour. The springs are carried through on a slat type conveyor and are heated to 1000 deg. F. during a time cycle of 52 min. This leaves them with a Brinnell hardness of 364-444. Heated air is blown into this furnace from two separate gas fired heaters mounted on top. These heaters are of the barrel type and are provided with automatic temperature controls, safety pilots, safety cut offs, etc. The final operations include finish grinding both ends, sand blasting, bulldozing, and scale testing. The finished outer coil spring weighs 9.7 lbs.

The inner coil spring is wound cold from 4375 in. round steel wire of S.A.E. 9260. Wound to an o.d. of 2 in. and in 10 ft. lengths these are cut into shorter springs each weighing .7900 lbs. They are then heated in a continuous gas fired furnace equipped with a chain conveyor and special alloy carriers. This furnace is 7 x 8 x 19 ft. overall and has 6 gas burners connected to 2 low pressure gas-air mixers and 2 automatic temperature controls. The work is in the furnace for 16½ min. where it attains a temperature of 1600 deg. F. and is then quenched in oil. The capacity of this furnace is for 413 springs per hour. The ends of the springs are now closed and broached. After drawing the springs in the same furnace as the outer coil springs they are Brinnelled, load tested, sand blasted and finally scale tested.

Boyd Becomes Division Supt. of Consolidated Edison

George Boyd, who has been superintendent of mains, services, and tunnels, gas distribution department, Consolidated Edison Company of New York, Inc., has been made division superintendent of the newly created division of Negotiations and Complaints, Department of Service Inspection and Records.

The new division will handle all complaints arising from electric and gas distribution construction and will carry on all negotations relating to Consolidated Edison reconstruction in connection with civic improvements.

Mr. Boyd has been with the Consolidated Edison System since 1911.

Lincoln Foundation Offers Opportunities for Gas Men

Engineers, designers and others in the gas industry have an opportunity in the $200,000 Award Program being sponsored by The James F. Lincoln Arc Welding Foundation to be richly rewarded for applying their spare time to study of electric welding as applied to construction of gas plant equipment. The opportunity is available to all engineers in the industry whether they are engaged in the manufacture or the operation of gas plant equipment. Any engineer, regardless of his position, can enter the Award Program.

A considerable number of engineers and designers in the gas industry have already indicated their intentions of taking part in the Award Program. By studying products and structures and by designing the particular product or structure so that it may utilize arc welded construction, these men are doing the work which may qualify them for one of the 446 Awards which range from $100 to $10,000. The studies which the men make are to be submitted to the Foundation in the form of papers, postmarked not later than June 1, 1938.

There is one feature about the Award Program which should induce participation on the part of many gas equipment engineers and designers. This feature is the fact that the product which is taken as the subject for a paper does not have to be built at the time the paper is written. This means that the papers will be entirely eligible if they simply show, by means of a design and description, how the particular product could be built by arc welding. Thus, a person may take part in the Program without going to the extent of actually building anything.

Another feature which should make participation attractive is the fact that the product taken as the subject for a paper does not have to be designed for welding in its entirety. A part of the product can be used as the subject and a paper written about the design of this part for arc welding.

The subject for the paper can be any gas manufacturing or producing machinery, including charging machinery, de-emulsifiers, dehydrators, heat exchangers, scrubbers, or any other machines used in the industry. Arc welding as applied to the manufacture of gas plant equipment is not new. Many arc welded products are in use in this field today. Typical examples are shown in the accompanying illustrations.

Fig. 1 shows a 30 inch blast gate fabricated of arc welded steel by the Gas Machinery Company of Cleveland, Ohio. This piece of equipment demonstrates the simplicity of arc welded construction. The gate consists of standard material such as steel plates and shapes cut to correct size and fused together into a single unit. The procedure used in making these gates consists of taking the parts as they are cut from the steel, assembling them together, then applying weld metal at all of the connecting seams. The resulting structure is as strong where it is joined together as anywhere else since the weld metal equals the plates in physical properties.

Fig. 1—30 inch Blast Gate of Arc Welded Construction.

Fig. 2 shows an arc welded purifier used in the manufacture of city gas.

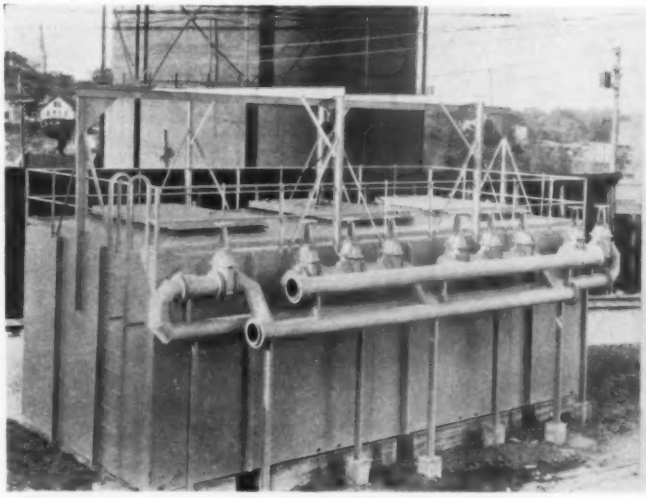


Fig. 2—Gas Purifier, assembled and Arc Welded by step-at-a-time method.

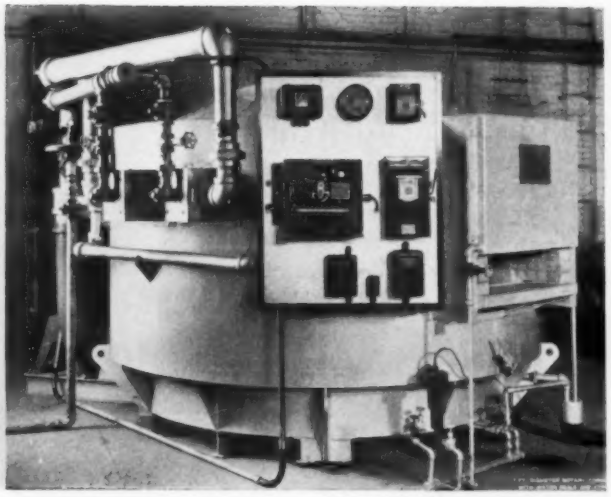


Fig. 3—Rotary Forging Furnace, 70 ft. in diameter. Main Structure and Parts Arc Welded throughout.

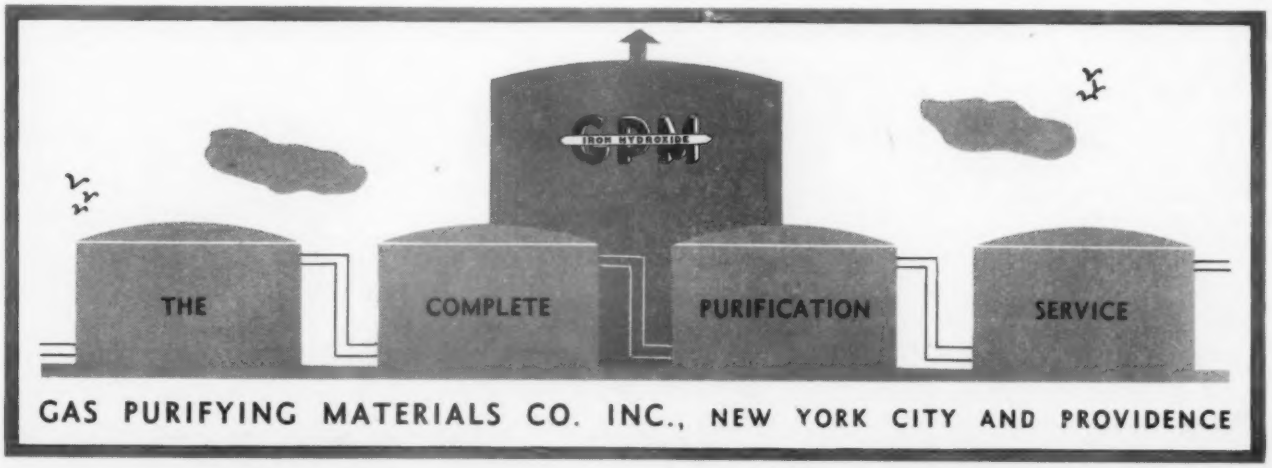
Although this purifier appears more complicated than the gate in Fig. 1, its construction is carried out by the same step-at-a-time method. The parts are first cut from standard material to the proper size, assembled together then fused, one with another, so that a single piece of equipment is produced.

Shown in Fig. 3 is a 70-foot diameter rotary forging furnace with water seals and syphon vents built entirely of steel arc welded. Although this furnace appears complicated in its finished form, it is really an assembly of comparatively simple elements. The base is built up of small I-beams and pieces of plate while the shell consists of larger pieces of plate joined together by welding. The other attachments consisting of piping connections, etc., are simply welded to the shell.

The equipment illustrated in Figs. 1, 2, and 3 was built with the advantages inherent in arc welded construction. The service life is the greatest possible because of the physical properties of the material used in construction. Steel is noted for its high tensile strength, ductility, resistance to fatigue, shock and impact. These properties are preserved throughout the structure when it is arc welded, inasmuch as the weld metal in the joints is as strong, rigid and as resistant to service conditions as the steel itself. Thus, the structure is uniform throughout.

In addition to this improved service life, arc welded products are manufactured with definite economy as compared to former methods. Inasmuch as fabrication of any product by electric welding consists simply of joining materials directly together, the method provides greatest possible simplicity of manufacture. The simplicity is reflected in simplified designing, reduced detailing and less handling of component parts. Then too, there is no necessity of making a pattern of the structure before it is built. The net result of this simplicity is a large reduction in manufacturing costs.

In order that the study of electric welding may be encouraged to enable manufacturers of all sorts of products and builders of structures to become better informed regarding the advantages which electric welding offers, The James F. Lincoln Arc Welding Foundation is offering $200,000 in Awards to the industrial field. The Award Program is set up in such a way that any product or structure can be taken as the subject for study. Products used in the gas industry are definitely eligible as subjects for papers. Engineers, designers and other members of the industry are therefore invited to take part. Any men who are interested can obtain complete particulars by writing to the Foundation, P. O. Box 5728, Cleveland, Ohio.



Validity of Gas Appliance Service Contracts

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

FREQUENTLY gas companies have legal controversies involving contracts of sale which contain a clause in which the seller agrees to render service on appliances or equipment for a stipulated period of time. Sometimes such litigations arise when the gas company is the seller, and in other instances the gas company may purchase the appliance, tool, equipment, or other apparatus for which the seller guarantees service.

Generally speaking, contracts of this nature are valid and enforceable by the purchaser, providing he fulfills the obligations which he assumed under the contract.

In other words, a seller always is obliged to perform service on his product in strict accordance with the terms of the contract, if the purchaser fulfills his agreement. However, failure of the purchaser to fulfill the agreement places the seller in an advantageous position. The law gives him the privilege and opportunity of deciding upon the next step or procedure.

Various courts have held that if a purchaser breaches or violates a contract of sale in any manner, as where he fails to make payments on dates specified in the contract, or he fails to accept delivery, as agreed, or he fails to use the subject of the sale in the manner prescribed in the contract, the seller may do any of these things: (1) He may refuse to continue to perform his obligations of the contract and sue the purchaser for damages and profits equal to his financial loss resulting from the breach; (2) or he may file suit and compel the purchaser to fulfill the exact terms of the agreement; (3) or, the parties may enter into negotiations and make a supplementary contract.

Now, while we are on this phase of the law it is well that readers realize that the courts consistently hold that a purchaser always is privileged to cancel a contract where a seller (1) fails to make delivery of merchandise on the date specified in the contract, whether such contract is verbal or in writing; or (2) fails to make delivery in the manner specified by the purchaser; or (3) where the seller fails in any other particular details to fulfill the assumed obligations, as installation, service, implied guarantee of quality, or the like.

Sellers Impliedly Guarantee Quality

In fact a seller guarantees, at least impliedly, that the subject of the sale is reasonably safe. This rule of the law is applicable to a manufacturer, the agent who represents the manufacturer, and the gas company which acts as the retail seller.

For illustration, in the recent case of King Company v. Ennis, 147 S. E. 119, it was disclosed that a woman purchased a gas stove from a gas company which acted as the retail seller who had purchased it from a manufacturer's agent. The stove was defective and caused an explosion when the purchaser attempted to light it.

The injured woman sued the manufacturer, agent, and retail seller for damages to compensate her for the injuries received. The retail seller attempted to avoid liability on the ground that the stove was in the same condition when he sold it, as it was when the manufacturer's agent delivered it. However, the court held all three of the sellers liable, stating the following important law.

"All three of the defendants were negligent and liable to the plaintiff (injured person) because of having manufactured, furnished, and sold to her husband for her use a defective appliance . . . . It is the general rule that the vendor or dealer, who is not the manufacturer, is under no obligation to test an article purchased and sold by him for the purpose of discovering latent or concealed defects, but that, when he purchases and sells an article in common and general use, in the usual course of trade, without knowledge of its dangerous quality, and with nothing tending reasonably to call his attention thereto, he is not negligent in failing to exercise care to determine whether it is dangerous or not. In such a case he may assume that the manufacturer has done his duty in properly constructing the article, and in not placing upon the market a commodity which is defective and likely to inflict injury . . . . However, this is to speak *only* of articles which are not inherently dangerous. . . . We think it may be reasonably inferred from all the facts alleged that the defect was one which a reasonably prudent dealer should have discovered before placing it upon the market and delivering it to a customer."

It is important to know that retail sellers, as gas companies which maintain retail departments, may avoid liability for injuries caused by defective appliances if the contract of sale made with the manufacturer contains a clause by which the manufacturer guarantees his product against defects and agrees that he will reimburse the retail seller for financial losses resulting from defective appliances.

Purchaser Imposes On Seller

After an appliance is accepted and in operation by the purchaser, the seller is bound by any and all reasonable provisions relating to the service which the seller has promised to give. However, the courts will not permit any purchaser to practice imposition on a seller, unless an imposition is clearly expressed in the contract.

For illustration, in one case a contract of sale contained a clause which "guarantees that the purchaser shall be satisfied."

Although the appliance was reasonably good and worth the purchase price, the purchaser continually and at unreasonable frequency requested the seller to supply an unnecessary amount of service in adjusting, repairing and otherwise performing work on the appliance.

At last the seller refused to give more service. Then the purchaser notified the seller that he was not satisfied. Since the seller had guar-

anteed satisfaction the purchaser demanded that the seller take back the appliance and refund the amount paid. He notified the seller that he would not pay other payments due.

The seller filed suit and proved that the appliance had given reasonably good service, notwithstanding the complaints registered by the purchaser. In view of this testimony, the higher court held the purchaser bound to pay the balance due.

On the other hand, if a contract of sale clearly and distinctly specifies the kind of service, on what dates inspections, alterations, adjustments and necessary repairs shall be made by the seller, then the latter positively is obligated to fulfill the exact terms of this contract. Failure of the seller to do so is a legal breach which entitles the purchaser to rescind the contract, demand the seller to take back the appliance or equipment and return the purchase price.

Installment Payments

The courts have held that under an installment payment lease or sale contract a purchaser may be compelled to pay the full amount due, if he fails to make one or more installment payments required in the contract. However, this rule of the law is not applicable with respect to appliances, or other apparatus which is sold or leased under contracts by the terms of which the seller agrees to keep the same in operating order for a specified period, or agrees to render services and fails to do so.

Moreover, the fact that a contract of this nature provides that the seller shall supply service at times when he believes the service is required means that actually service must be rendered when *it is required* whether or not the seller believes that service is necessary.

For example, in the leading case of Sinn, 30 P. (2d) 761, it was disclosed that a seller entered into a written agreement whereby it agreed to lease to a purchaser certain equipment for a stipulated rental, to be paid in weekly installments. The contract contained the following clause: "In the event of default in the payment of any installment of this note, the holder (seller) thereof may at its option declare the remaining installments note then due hereunder *immediately due and payable.*"

The contract also provided that the seller would from time to time inspect the equipment and supervise such repairs and adjustments as may *in its opinion be necessary* for its operation and maintenance. Also, any breach of the contract upon the part of the purchaser made him liable for the balance due under the contract, and for any and all damages sustained by the seller by reason thereof.

After the purchaser had made several weekly payments, he defaulted in making further payments on the contention that the seller had not rendered service when actually it was necessary. However, the seller repossessed the equipment, and immediately thereafter filed suit to collect the entire balance on the contract price.

In view of the fact that this contract contained the above mentioned service clause by which the seller agreed to keep the equipment in operating order, and the testimony indicated that the seller had not rendered service when it was reasonably necessary, the higher court held the purchaser not required to pay the balance due on the original rental contract, and said:

"In the instant case the agreement to make the weekly payments was based upon consideration of the use of the equipment and the service which plaintiff (seller) was to render in keeping the equipment in operating order. . . . When plaintiff re-possessed the equipment it was not entitled to the unpaid balance, for it was not in a position to allege or prove performance upon its part."

Now, if this had been a sale contract, instead of a rental contract, the higher court would have required the seller to take back the equipment and the seller would have been liable in damages to the purchaser for failure to render the agreed services. However, since it was a rental contract and the purchaser had used the equipment and had received value for the rentals which were paid, the court merely declared the contract to be at an end and held the purchaser or user not bound to pay other rentals specified in the contract, although the user had breached the contract by his failure to pay rentals when due.

Purchaser Violates Agreement

In all legal controversies involving contracts for service the important consideration is: Did either the buyer or seller fail to fulfill his obligations assumed in the contract? In other words, while a seller is liable for his failure to perform service in accordance with the terms of the contract, failure of a purchaser to keep an appliance or other apparatus in proper adjustment, if it is required in the contract, also is a breach on the part of the purchaser which renders the latter liable.

For illustration, in Carisch, 255 N. W. 814, it was shown that a purchaser purchased a machine and paid $500 down. He was to pay the balance in twenty-four monthly installments. In addition to this sum, the purchaser was to pay a stipulated amount for service and inspection to be supplied by the seller. The contract stated that the seller was to supply and install the equipment and supervise its repair and adjustment so far as, *in its opinion,* "it was necessary for the satisfactory operation and maintenance of the equipment." Also, the contract provided that the purchaser agreed to keep on hand necessary repair parts and bound himself to keep the equipment in good and efficient working order and condition, and if a defect or faulty adjustment developed which could not be immediately corrected by the purchaser, he was bound to communicate promptly with the seller and to refrain from using the machine until it was properly adjusted.

Another clause in the contract provided that if the purchaser defaulted or breached the agreement the seller was entitled to collect the entire balance due on the contract price.

The evidence tended to show that the equipment got out of adjustment and failed to operate satisfactorily. The purchaser failed to make the agreed payments and the seller filed suit. The court held the seller entitled to recover the entire balance due because the purchaser failed to notify the seller when the machine got out of order.

The Law of Used Equipment Sales

It is well settled that a gas company which purchases new equipent or machinery has an implied guarantee that the subject of the sale is reasonably worth the purchase price. However, this rule is *not* applicable with respect to used or second-hand materials.

For instance, in McDonald v. Dorfman, 32 S. W. (2nd) 443, it was disclosed that a seller sold and delivered used supplies, materials, and casings, for the sum of $3,887.32 for the purpose of drilling oil and gas wells and taking care of the production therefrom on oil and gas leases. The purchaser refused payment on the contention that the pipe and equipment were not reasonably worth

the purchase price. However, the court held the purchaser liable for full payment, and said:

"It is undisputed that the property, the casing, was second-hand. It was known by the parties to be second-hand and was sold as such. It is undisputed that the purchaser had the opportunity to inspect the property. . . . When one buys second-hand property, knows it to be second-hand, and either inspects it or has the opportunity to do so, there is no implied warranty."

Rights of Purchaser

If a seller fails to conform with and abide by reasonable and valid obligations to render service, the purchaser may rescind the contract and demand the seller to take back the appliance, machine, or other apparatus and demand a refund of the amount paid on the purchase price. This same rule of the law is applicable if the testimony shows that the seller knew the purposes for which the purchaser intended to use the subject of the sale at the time the contract was made, and it would not perform the work.

For example, in J. V. Cox, 178 S. E. 585, it was disclosed that a buyer purchased an appliance under a conditional sales contract which specified that a specified amount was to be paid cash on delivery, and the balance of the purchase money was to be paid in three months. The conditional sales contract contained the following warranty: "The seller warrants each product to be well made, of good material, durable with good care, and, if properly set up, adjusted and operated by competent persons, to be capable, under ordinary conditions of doing the work for which it is designed."

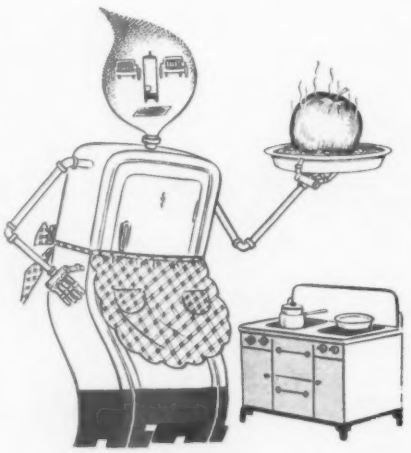
The purchaser failed to pay the balance due alleging that when the appliance was delivered to him it was defective, wasteful in operation, and was not capable under ordinary conditions of "doing the work for which it is designed." The seller filed suit to recover the amount due and the purchaser sued the seller to recover the amount he had paid on delivery of the appliance.

During the trial the purchaser proved that the appliance was out of balance and did not run true. Therefore, it is interesting to know that the higher court held the purchaser entitled to recover the full amount paid to the seller.

Oklahoma Adopts New Variable Cartoon—"Handy Heat"

Recently making a bow to Oklahoma consumers is "Handy Heat," new business getting character created for the Oklahoma Natural Gas Company, extensive state operator. Destined to adorn all this company's future advertising, "Handy Heat" will also be seen exerting his load building appeal from dealer advertising throughout their trade area.

"Handy Heat" is all gas, in truth all natural gas. His head is formed by a flame, his eyes are radiant fires, his nose, a hot water tank, and his mouth, sometimes a floor furnace, sometimes a smile-turned piece of gas pipe. Arms, hands and fingers are of gas pipe and fittings. His body may be a gas refrigerator or a hot water tank, and, no doubt, he



will yet blossom out an embodied gas range, et cetera.

Ingeniously demonstrating the varied uses of natural gas, the versatile fellow is by no means confined to the straight lines of his parent appliances, but, as automatic and flexible as gas itself, willows, bends, stoops or twists as the situation calls for.

In his first appearance "Handy Heat" sedately posed in a man-to-man greeting with Oklahoma City's mayor, Frank Martin. Again, donning a kitchen apron, she does the Big Apple up brown, serves the turkey or what have you. This kaleidoscopic personality even does a threesome to aid the building campaign, illustrating heating, cooking and cooling.

The company who sponsors "Handy Heat's" cavortings through the state's advertising sheets, staunchly and unblushingly avers that "no home is strictly modern without his helpful, healthful, cheerful, automatic service"; that "to know him is to acclaim him"; and "his constant devotion and silence costs less than any other modern home servant."

"Handy Heat" is a creation of Ed. Galloway, veteran Oklahoma City advertising expert.

Carbon Black Plants In Oklahoma

The Oklahoma Corporation Commission recently granted the Magnolia Petroleum Company a permit to construct and operate a carbon black plant near Stonewall on the edge of the Fitts field in Pontotoc County.

The permit limited the company to the use of residue gas only in operating the plant, which will cost approximately $750,000 and is expected to be in operation early in 1938. The "use of gas direct from well head" was specifically prohibited. Evidence at the hearing was to the effect that enough residue gas is now going to waste there to operate the plant profitably for four or five years.

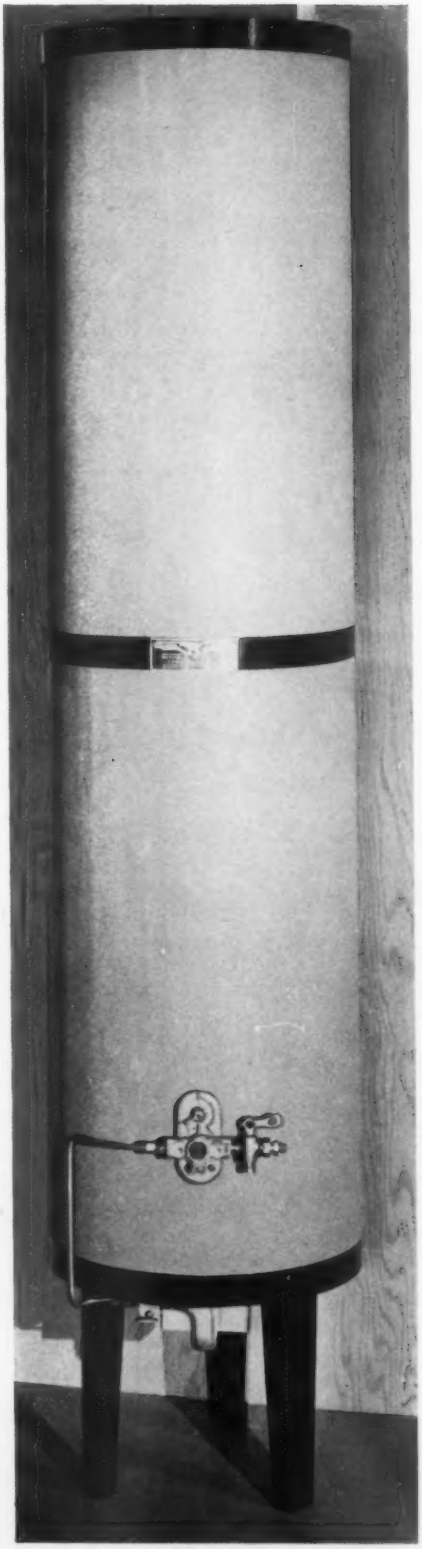
Another carbon black plant is being erected by Hagy, Harrington & Marsh, Inc., of Amarillo, Texas, near Guymon, in the Oklahoma panhandle. A ten-year permit for the latter plant was obtained by Stanley Marsh, Jr., of the firm. This plant, which it is said, will represent an approximate investment of $1,000,000, will furnish employment for about 100 men. The firm agreed to purchase all natural gas produced and offered for sale in the vicinity, and to pay from 1 to 1¼ cents a 1,000 cubic feet for the gas.

A second plant going in near Guymon is that of the Atlas company, an H. L. Doherty organization subsidiary, which will use the dry sweet natural gas from the Guymon field to manufacture a chemical carbon product used in the treatment of rubber, which is called "Gastex." This plant, capable of consuming 5,000,000 cubic feet of gas a day, will use gas from two wells of the Cabot Carbon Co.

The sixteenth legislature, 1937, killed two bills which would have prohibited the manufacture of carbon black from sweet gas.

The carbon black plant owned by the Westoak Gasoline Company, located in Beckham County near Erick, has resumed operations after having been shut down nearly five years. A $60,000 general improvement program preceded reopening of this plant, which had been damaged considerably from dust storms prevalent in the vicinity for the past several years.

STOP AND GO SELLING



We don't know much about gasoline but we do know that STOP and GO selling is the reason for the high cost of water heating sales.

If your salesmen have the STOP sign against them on three out of every four customers it is apparent that their time is wasted and their market very, very limited.

The Republic LO-BILL Conversion Water Heater is the siren that will nullify these STOP signals and make a path for your men.

When your men can multiply their market three times and have the LO-BILL permit to blast through all STOPS, then they can really go places and do things.

The LO-BILL does build LOAD

The Republic LO-BILL is not a sidearm conversion but is fitted to the tank in such a way as to utilize the same proven principles of under-fired heat transfer employed by the great majority of gas designed water heaters. The price of the LO-BILL is so reasonable that there is no excuse for offering your customers anything less than this fully automatic job.

"YOU CAN DO IT BETTER WITH A REPUBLIC"

AUTOGAS CORPORATION

2258 Diversey Pkwy. Chicago, Ill.

GENERAL SALES AGENT REPUBLIC HEATERS SALES CO. CHICAGO, ILL.

When your Chef has CONTROL he can save MONEY for you

THIS ADVERTISEMENT IN HOTEL, RESTAURANT AND HOSPITAL MAGAZINES WILL WIN NEW COMMERCIAL GAS CUSTOMERS AND HOLD OLD ONES

ONLY [illegible] DUTY [illegible] GIVE YOU:

TROUBLE-FREE TOP HEAT CONTROL

With this dial you select your desired top heat. Foods cook uniformly because of the flexible, high-speed, even-heat gas burners, and the special heat-spreading fins on the underside of the smooth polished, one-piece top cooking plate, of Magic Chef metal alloy.

FAMOUS "RED WHEEL" OVEN HEAT CONTROL

With this most widely used oven heat regulator you are assured uniformly perfect results in baking, roasting, or oven cooking—*without watching.* Roasts are more juicy and tender, and there is less loss from shrinkage.

Model No. 171-1

HEAT CONTROL MEANS GREATER ECONOMY, HIGHER EFFICIENCY AND BETTER COOKING RESULTS

Besides saving on fuel, *Heat Control* releases your chef's time for other work, brings about lower food costs, and more uniform and better dishes. Find out for yourself how Magic Chef Heavy Duty Equipment will improve your cooking and effect savings in operating costs of from 30% to 48%. (These are proven results from actual installations.)

Write or phone our nearest office. A special representative will bring complete information.

Magic Chef
AMERICAN STOVE COMPANY

MAGIC CHEF AUTOMATIC HEAVY DUTY EQUIPMENT

Exclusive Features

Red Wheel Lorain Oven Regulator
Magic Chef Top Heat Control
Uniform Heat Top — Insulated Cooking Top
Automatic Safety Oven Pilot
Magic Chef Non-Clog Burners

•

Gas Economy — Greater Speed
Easiest to Clean — Simplest to Operate
Higher Efficiency — Greater Durability

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LOOK FOR THE RED WHEEL WHEN YOU BUY A MAGIC CHEF

What About The Summer-Winter Hook-Up?

By

J. Scott Fowler

President, The Lovekin Water Heater Co.

IN an increasing number of situations, oil-burning heating furnaces are being equipped to supply domestic hot water. While the primary function of these furnaces is to heat the premises, there is a definite trend toward fitting them with auxiliary equipment to supply hot water service as well and to operate them the year round,—the so-called summer-winter hook-up.

The idea is an outgrowth of the old practice of installing water backs or coils in coal furnaces under the mistaken impression that the hot water is obtained without cost, inasmuch as the fire has to burn anyhow.

However, the new idea of using the oil burner is much more formidable competition, and many popular and plausible arguments are advanced in its behalf. It is automatic, it furnishes hot water in summer as well as during the heating season, and vigorous claims are made for its low cost.

There are two types of oil-fired heaters involved.

1. The self-contained boiler especially designed for oil fuel with a built-in coil for domestic hot water.
2. The coal-designed boiler equipped with a conversion oil burner and a water heater coil or Heat Exchanger connected to the boiler with piping.

In both cases an additional storage tank is usually used for domestic hot water and this tank is connected to the heater coil by circulation pipes and heats up just like a circulating tank gas heater.

In both cases, the furnace is equipped with an aquastat, which is a thermostat mounted either directly in the heater proper or in the circulating piping to the storage tank, but apparently never in the storage tank. This thermostat is set pretty high (sometimes 180°) and turns the oil burner on and off, but as it is not mounted in the storage tank, it can only control the domestic water temperature indirectly. (In some situations, heat exchangers are used without aquastats and with bare storage tanks. The weaknesses of such installation are quite evident, resulting in large radiation loss, excessively hot water in cold weather and inadequate supply in "fringe" heating periods.)

With a summer-winter hook-up, means must be provided to make sure no heat gets up into the house radiators in summer time. This is done by running the supply lines into a manifold where a large valve is provided or by putting valves on every supply line leaving the heater. These valves are closed in summer time.

With a steam system, the claim is made that these valves are not required, as the temperature necessary for hot water service is below the 212° steam temperature and thus the radiators get no steam. However, when steam is needed for heating, provision must be made to prevent overheating the domestic hot water.

Manufacturers of oil designed boilers make extravagant claims for efficiency, and while these boilers are undoubtedly more economical than the usual run of conversion heaters, they do lack recovery. A well known maker recommends a forty gallon storage tank for one bathroom with four people in the family, and a sixty-six gallon storage tank for two bathrooms with four to six people in the family.

When this particular furnace is used as a steam system, the manufacturer recommends carrying 180° water in the domestic storage tank, and using a mixing valve to serve the household. Both of these facts indicate slow recovery.

Cost of Installation

Summer-winter hook-up is expensive in first cost.

Complete oil-designed furnaces cost about $1000.00 installed, but just what portion of this should be allocated to domestic water heating is problematical.

The cost of a summer-winter hook-up on a present oil-fired conversion unit varies so much that it is impossible to give accurate average figures. It depends on the size of the tank used, whether or not it is insulated, the cost of valving the mains, the kind of aquastat or thermostat which is selected and whether it is a cheap, inefficient surface contact thermostat or an expensive one properly inserted in the furnace. (Some furnaces do not have a suitable tapping for this purpose.) However, we can safely state that the cost runs from $100.00 to $350.00 and even higher on large installations. (In some steam installations and in new home construction claims are made that the cost can be kept below $100.00.)

Cost of Operation

Two years ago a series of comparative tests were made at the Massachusetts Institute of Technology, Cambridge, Mass., to determine the actual cost of heating water for domestic purposes. All types of heaters and various kinds of fuel were tested in the most extensive series of tests ever made on this subject and the results have been published. They are authoritative because of the unimpeachable standing of this laboratory.

These M. I. T. tests show that oil costs more than gas to heat water. This is proven even in the case of the most efficient oil-designed boilers with built-in water-heating coils.

The oil costs vary greatly in summer and winter, being lower in winter time when the heater is in normal operation and higher in summer time when it is being used solely to supply domestic hot water.

M. I. T. states it costs $6.60 per month in the summer time and $1.54 in the winter time to heat 50 gallons of water 100° rise, or an average for the year of $3.65 per month. This is

Reprint from current Lovekin Sales Manual.

the bare cost of fuel only and is based on 7½-cent oil used in a standard conversion oil burner.

In the case of oil-designed furnaces the stated costs were $2.92 in the winter and $3.81 in summer, or a yearly average of $3.30 per month.

With 6-cent oil, these figures work out $2.92 per month for a conversion burner and $2.64 per month for oil-designed furnaces. These figures furnish little argument for using oil when its other costs and objectionable features are considered.

Our difficulty, and at the same time the salvation of the oil-burner people, is the fact that the actual results in service are difficult to check and few customers try to do it.

The man who is willing to pay $1000.00 for an oil furnace or from $100.00 to $350.00 for a summer-winter hook-up on a conversion oil burner rarely knows what his hot water is costing him and goes along blissfully paying more for it than for gas because the oil-burner salesman told him it costs practically nothing and he can't be checked up.

Depreciation of Equipment

A real objection to summer-winter hook-up is the excessive wear and tear on the burner equipment due to its summer operation. The burner only burns a few minutes, but it comes on many more times because the thermostat is in the boiler and only indirectly controls the stored water in the tank. The fuel input is so large in relation to the amount of water to be heated that a few minutes' operation raises the temperature in the boiler to its shut-off point and then its heat has to be transmitted by circulation to the storage tank. This cycle continues in spasmodic repetition until the storage tank is brought up to temperature. The M. I. T. tests show that under summer conditions the burner came on 18 times, whereas in winter it only came on 6 times a day. Doesn't this excessive "stop and go" operation mean excessive depreciation of expensive equipment?

To recapitulate, we list the following objections to a summer-winter hot water hook-up with an oil burner, as compared to a modern gas-fired automatic gas water heater:—

1. The first cost is greater than a comparable gas water heater.
2. The year-around operation cost of oil is higher than that of gas, as proven by exhaustive and impartial tests by one of the most important testing laboratories in the country. (In summer, it is twice as much as gas, where conversion burners are used.)
3. Using expensive oil-burner installations throughout the summer is like pushing a baby carriage with a locomotive and just about as efficient. The average life of an oil burner is (7) years when operated solely in the winter time, if used also in the summer, its life is much reduced and this introduces an important depreciation factor, which must be taken into account when figuring costs.
4. The constant "stop and go" summer operation is responsible for—
   A. Excess wear and tear.
   B. A cold chimney, — the heater is not in operation long enough to heat up the chimney and results in poor combustion, objectionable odors and more soot and dirt.
5. Hot cellars throughout the hot weather with the possibility of the heat being felt on the first floor.
6. Noise of operation (and in some cases the smell of burning oil) all summer long.
7. Uncertain operation and control of water temperature unless expensive equipment is purchased. If a mixing valve is used, the uncertainty is increased, as many of these valves are unreliable.
8. Unless over-size storage tanks are used the customer will have insufficient hot water at times due to the slow recovery of most types of oil burners.
9. Conflicting and extravagant claims of oil-burner salesmen.

This latter point may be helpful in discouraging the intelligent oil-minded customer. There is no uniformity in presenting oil claims; they vary widely and are full of such phrases as, "Your domestic hot water is practically free"—"You can save enough on the lower oil cost of a summer-winter hook-up over the cost of gas to pay for the cost of the oil equipment in two years and from then on you are in clover."—"You get (20) gallons of hot water for one cent." These statements are not true; they cannot be realized and in the end will act as a boomerang and defeat their purpose.

There is no substitute for a modern gas water heater. It has lower first cost, lower operating cost, longer life, better recovery, closer control and less repair cost than any oil-burner equipment at present on the market.

Most Appliance Engineers have concluded that it is not good practice to combine two forms of service in one appliance.

This has been tried in many ways familiar to all of us, such as water-backs in kitchen coal ranges, hot water coils around gas range burners and in furnaces, water-backs in incinerators, radiators connected to automatic water heaters and heating sections connected to gas ranges. While such combinations give a certain amount of service, they are inadequate and unreliable and have been proven so in countless cases. The same principle applies to the summer-winter hook-up.

A gas water heater especially built for the purpose, with storage and recovery capacity suited to the needs of the household and responsive only to those needs, is surely more likely to give 100 per cent hot water service, than a system designed for heating and which renders hot water service only as a by-product of its real function.

Finally, the probable trend of market costs of oil versus gas should be considered.

Although the price of oil has been relatively steady in recent years, nevertheless, it is a basic commodity and subject to the vagaries of a changing market and directly influenced by the law of supply and demand. There are many grades of fuel oil and the only guarantee of uniformity of quality and accuracy of delivery to the customer is the integrity of the particular dealer from whom he buys his supply.

Rumors of exhaustion of the oil supply, whether true or not, continuously threaten the market price, but much more imminent is the threat of a fuel oil tax of as much as 3 cents per gallon. Such tax has been proposed a number of times both at Washington and at several State Legislatures, and while it has always been voted down, yet in these days of unbalanced governmental budgets it would not be unreasonable to expect some kind of a fuel oil tax in the near future.

On the other hand, gas rates have steadily declined for years and the tendency is still downward. Our gas supply is a public utility regulated by law and controlled by Public Service Commissions. The price and quality are stable and likely to be so maintained for years to come.

Gas Water Heater Prize Parade Progresses

With gas company registration figures steadily mounting, officials of the 1938 Automatic Gas Water Heater PRIZE PARADE are looking forward this month to a final enrollment considerably in excess of last year's record mark. Since the announcement of the campaign, (January issue page 30) 180 gas companies have filed registrations enrolling 1500 salesmen and new registrations are being received daily, according to the AGA Water Heating Committee.

The first automatic gas water heater sales drive sponsored by this committee and the Gas Water Heater Division of the Association of Gas Appliance and Equipment Manufacturers, back in 1936, was supported by gas companies representing 54.6% of the country's gas meters. The Golden Faucet Contest last year, under the same sponsorship, enlarged the coverage of gas company registrants to include 70% of the total gas meters. Every indication points to an even greater representation in the 1938 Automatic Gas Water Heater Prize Parade.

"We attribute much of the popularity of this year's program to its unique prize plan," states E. R. Williams of the Binghamton (N. Y.) Gas Works, Chairman of the American Gas Association Water Heating Committee. "Smaller companies, who felt that previous campaigns offered little opportunity, have been especially enthusiastic about the feature wherein 'everybody wins a prize'."

In addition to the heavy enrollment of gas companies, upwards of 15,000 selected plumbers and retail water heater dealers are expected to participate in the Prize Parade, according to Mr. H. N. Ramsey of the Welsbach Company, co-chairman with Mr. Williams of the National Automatic Gas Water Heater Sales Committee which is directing the campaign. "Although, of course, we cannot expect registration forms from retailers," Ramsey asserts, "we are confident that they will be eager to join in the Prize Parade. With no competition and no geographical classification, the success of every retailer depends entirely on his own efforts."

Prizes Are Featured

Keynoting the phrase, "Everybody Wins!" the Prize Parade provides for distribution of awards on a specific point basis. Every sale of an automatic gas water heater produced by a sponsor manufacturer counts toward one of the prizes.

A choice of more than 300 valuable merchandise articles is offered to every participant, gas company salesman and retailer alike. In a wide variety that includes many famous brands, the prizes range from home furnishings and appliances, through clothing and sporting goods, to jewelry, toys, and many other items.

Sales Managers Receive Portfolio and Wall Charts

Introduced to the Prize Parade by a prospectus mailed early in January, Sales Managers who register for the program receive a 10-page sales portfolio and a set of large wall charts. The portfolio contains detailed information on various sales helps, together with instructions for their most effective use. It also presents winning sales ideas furnished by last year's leading companies. The wall charts, an innovation in this year's program, provide an easy means of recording daily and monthly sales, and of stimulating wholesome rivalry among the salesmen of each company.

All Participants to Get Regular Mailings

In addition to these two sales helps for gas company executives, regular mailings will be dispatched to gas company salesmen and to retailers, showing them how to make their efforts more effective during the Prize Parade, and stimulating them to keener activity.

As a new feature this year, wives of gas company salesmen will receive a booklet and a pictorial letter —both showing the wives how they can devote leisure hours to helping their husbands win more prizes.

With an increase of ten over the number of sponsors for last year, the national automatic gas water heater sales program for 1938 is backed by firms representing more than 95% of the water heater manufacturers. The list appears in the January issue of the JOURNAL.

Still Time to Enter the Prize Parade

Even though one full month of the Prize Parade has passed, gas companies which have not yet registered are urged to enter the program as soon as possible. From the day of registration, all sales of automatic gas water heaters produced by sponsor manufacturers will count toward the array of more than 500 merchandise awards. To register, write direct to the Water Heating Committee, American Gas Association, 420 Lexington Avenue, New York, N. Y.

K. C. Gas Co. Changes Rentals to Sales

One of the most successful campaigns ever conducted by the new business department of the Kansas City Gas Company resulted in the converting of 978 rental orders on water heaters to sales during the month of December.

The successful campaign proved conclusively the soundness of the rental plan on water heaters when it was put into effect on March 1, 1935. The rental plan of giving customers the opportunity of paying small rental payments gave the company much additional water heating load that it was not possible to obtain under a straight selling plan. Salesmen were able to interest a large number of home renters who, because they did not own their own homes did not feel justified in signing a contract agreeing to purchase the heater.

In converting rental orders to sales the company allowed a 20 per cent discount on the unpaid balance of the rental order. It was found that a large number of customers that were closed during the month took advantage of the discount and paid the balance in cash. A number of others were converted from the rental plan to the company's time payment plan.

According to H. C. Porter, new business manager, the department again will hold a campaign to convert water heater rentals to sales during the month of April.

At the time the December campaign was inaugurated on December 1, the Kansas City Gas Company had approximately 2,600 water heaters on the company lines under the rental plan. This means that during the one month's campaign, from December 1 to December 31, the company sold 38 per cent of the water heater rentals on the lines in Kansas City.

The company also was successful the past year in converting a large number of conversion burner rentals to sales.

The rental plan is no longer in effect at the Kansas City Gas Company or in the other Gas Service Company properties due to arrangements which were made last year in lengthening the time payment sales contracts.

1937 Sales Gains and 1938 Plans Discussed at Portland, Ore.

By Donald M. Johnson

Fifteen thousand gas appliances valued at approximately $1,000,000 will be purchased from Portland (Ore.) Gas & Coke Company and appliance dealers during 1938, according to "The New Momentum" business development program announced by John J. Winn, Jr., commercial manager, at the company's annual 4-day sales conference.

Gas appliance sales in 1937 showed a 23 per cent increase over the previous year and a similar gain is expected in 1938, Winn stated in announcing a goal for the next twelve months of 6000 gas ranges at $540,000; 5000 water heaters at $175,000; and 1000 major house heating appliances at $230,000. Gas-fired refrigerators, supplementary heating appliances, hot plates and miscellaneous equipment are expected to account for the remainder of the $1,000,000.

Most phenomenal 1937 increase over 1936 was a gain of 134 per cent in automatic storage water heater sales which, even when averaged with a 25 per cent increase for tank water heaters, accounted for a gain of 48 per cent in water heating equipment.

Major house heating equipment sales were up 51 per cent, showing a break-down as follows: conversion burners 86 per cent, gas-designed furnaces 40 per cent and floor furnaces 36 per cent.

Promotion of all-gas service during 1938 will be backed by a consistent local advertising campaign in which the convenience, economy and dependability of gas will be stressed.

The annual 4-day sales conference was attended by more than 100 Portland and district salesmen, supervisors, home economists and office workers. Sessions were held in the Public Service building, at the plant and in the shop, with subjects ranging from gas making to rate making.

In a program arranged by R. B. Elliott, sales promotion manager, were included sessions on house heating, conducted by C. M. MacGregor, sales engineer; water heating, by C. W. Steele, residential sales manager; gas in industry, by A. O. Leech, industrial sales manager; and rates, by Sidney Caldwell, rate engineer. Sessions also were devoted to such subjects as sales coverage, practical cooking demonstrations, refrigeration, etc., with the conference meeting sometimes in groups and sometimes jointly.

Combined with the inspection tour of the huge gas manufacturing and by-products plant and the visit to the service department the conference presented an enlightening cross-section of gas company activities.

Talks were inspirational as well as educational and speakers included officials of the gas company, sales supervisors, various factory representatives, and salesmen.

Lone Star System Uses Photo Contest to Stimulate Heating Sales

In order to focus attention on gas heating and to foster a sort of gas equipment consciousness among its consumers, the Lone Star Gas System, which operates in various Texas and southern Oklahoma communities, recently conducted a ten-week photo contest.

Photos to be eligible were required to show an interior view of a home served by one of the five companies in the system, and must include a view of gas heating equipment. Ten $10 prizes were awarded each week for the best photos submitted and at the close of the contest, December 18, four grand prizes of $100, $75, $50 and $25 were awarded. Entries were received at any gas company office or by mail at 305 South Harwood Street, Dallas, Texas, headquarters of the system.

The five companies—Lone Star Gas Company, the Dallas Gas Company, County Gas Company, Community Natural Gas Company and Texas Cities Gas Company—serve Dallas, Fort Worth, Brownwood, Paris, El Paso, Wichita Falls, Bowie, Taylor, Waco, Denton, Galveston, and other Texas cities and Frederick, Durant and a number of other towns in southern Oklahoma.

Entrants were not confined to one photo nor to any certain type of gas heating equipment. Pictures came in showing all types, some modern, some antiquated, including furnaces, radiators, gasteam radiators, floor furnaces, radiant gas heaters, gas circulators, and the like. All photographs entered, whether prize winners or no were to become the property of the Lone Star Gas System to be used as desired by the company. Company employees were not eligible to submit entries.

Full page advertisements in local daily and weekly papers were effectively used to announce the contest and names of winners each week.

Home Service Activities

It Costs Less To Cook at Home—Elizabeth Sweeney in the New York State Electric and Gas Corporation at Geneva, N. Y., describes an interesting series of demonstrations devised to prove a new claim in utility service, which is that women may earn actual money by doing more cooking at home instead of buying so many prepared foods. In each demonstration emphasis was turned toward the meter registering the gas consumed, costs of the food prepared and the time consumed. Representative costs and time were estimated for the use of foods bought ready cooked.

The demonstrations were given to church groups in various towns through the district served by this company. The plan was followed of giving to the society 10c for each member attending the schools. As a result a maximum attendance was secured, and many new people were brought to the company's offices. Sales in equipment have resulted, and in one of the churches, the check received from the company was turned over toward the purchase of two new gas ranges to replace old ones formerly used in the church kitchen.

The four demonstrations comprising the series have these titles: "For Goodness Sake!"; "Easy Dough"; "Stirring Days in the Kitchen" and "Penny Minded Menus."

Community Cooking Schools—In Baltimore continued success marks the Community Cooking Schools of Mrs. Alice Lytle, Home Service Director of the Consolidated Gas, Electric Light & Power Co. Contacts with various community churches have resulted in a plan of offering a cooking school for two weeks in each territory, paying the church for the use of the room for demonstrating purposes. Ten demonstrations are given in the two weeks, and for this purpose a portable kitchen arrangement is set up by the gas company.

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The attractive appearance of BARBER Regulators, harmonizing with modern design in heating equipment, has induced many appliance makers to include them as standard equipment. BARBER regulators are built to the highest standards of precision, and operate to 3/10 pressure drop. All-bronze body, brass working parts. Size ¼" to 1½" tested and certified by A.G.A. Testing Laboratory.

For appliances which you sell, sponsor, or make, let the BARBER Regulator stand as an additional emblem of Quality!

Priced for PROFIT TO YOU! Write for catalog and price list on Barber Burner Units for Gas Appliances, Conversion Burners for Furnaces and Boilers, and Regulators

Made in the following sizes: ¼", ⅜", ½", ¾", 1", 1¼", 1½", 2"

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BARBER GAS PRESSURE REGULATORS

Gas Units Feature Heating & Ventilating Exposition

"The number of exhibitors showing new gas heating and air conditioning equipment at the Fifth International Heating & Ventilating Exposition held at the Grand Central Palace, New York, N. Y., Jan. 24-28 was a striking example of the growth of public acceptance of gas fuel as a heating and cooling medium" Frank H. Trembly, Vice Chairman, Industrial Gas Section, A.G.A. and Chairman of the A.G.A. House Heating & Air Conditioning Committee, declared after visiting the Exposition. "Practically every manufacturer of central heating appliances featured gas units by themselves or gas and other fuels together," he said. "It is evident that heating equipment manufacturers are prepared, in 1938, to include gas heat in their promotional program."

"Featured throughout the exposition were many new developments in gas air conditioning, heating, humidification and dehydration for domestic, commercial and industrial purposes. A very definite tendency toward adoption of forced warm air winter conditioning was in evidence. Meetings of the American Society of Refrigerating Engineers and the National Warm Air Association were held in the Roosevelt Hotel while those of the American Society of Heating & Ventilating Engineers were held in the Biltmore.

The Industrial and Commercial Air Conditioning Committee of the Industrial Gas Section, American Gas Assn. held a meeting just prior to visiting the Exposition. Seated left to right: Leon Ourusoff, Washington Gas Light Co., Washington, D. C., Vice Chairman; Roy P. Wilson, The Philadelphia Gas Works Co., Philadelphia; Charles R. Bellamy, Columbia Gas & Elec. Corp., New York, N. Y., Chairman; H. C. Haroldson, The Commonwealth & Southern Corp., Jackson, Mich. Standing: C. F. Cushing, The Bryant Heater Co., Cleveland; Kendall B. Castle, Rochester Gas & Elec. Corp., Rochester, N. Y.; F. M. Johnson, Surface Combustion Corp., Toledo; D. S. Reynolds, Boston Consolidated Gas Co., Boston and J. C. Patterson, Carrier Corp., Syracuse, N. Y., Vice Chairman.

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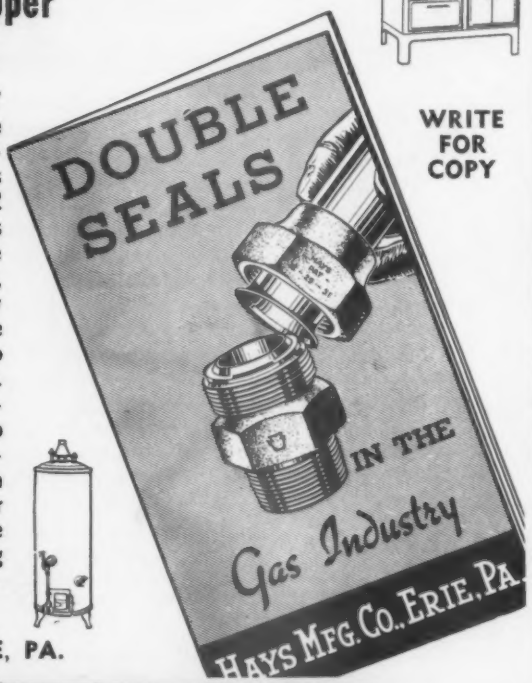

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Specify HAYS DOUBLE SEALS

Ruud Adopts Monel Metal for Water Heater Tanks

Selection of monel storage tanks for a newly designed line of Ruud automatic gas water heaters was announced recently by A. P. Brill, president of the Ruud Manufacturing Company at the annual meeting of the Company's Regional Managers in the United States and Canada.

"The demand for rustless and resistant equipment has spread from industry into the home," Mr. Brill said. "Within the last ten years brass piping has become standard for the water supply systems of new homes, and it is a natural development of this trend that the hot water storage tank, a potential factor for producing rust, should be made of monel which has established its position as one of the leading materials in industry's war against rust and corrosion."

The new gas water heaters will be in five sizes ranging from 20 gallons to 75 and are designed for household, commercial and industrial hot water service. They will be manufactured in the Company's plants at Pittsburgh, Kalamazoo and Toronto.

Annual Convention A.G.A.E.M.

Several hundred manufacturers of gas appliances, equipment, and accessories, from all parts of the United States and Canada will meet in White Sulphur Springs on May 25th at the annual convention of the Association of Gas Appliance and Equipment Manufacturers, it has been announced by Merrill N. Davis, president of the Association.

The three-day convention will be held at The Greenbrier where the delegates of major industrial manufacturing companies will discuss matters of national importance in the gas appliance industry.

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Pittsburg's *Automatic* Gas Storage Water Heater
MODEL M-I"
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THIS Pittsburg heater keeps water at desired temperature by thermostatic control. It is also equipped with automatic safety pilot light control. Chace Thermostatic Bimetal is the actuating element used to produce the necessary action.

If your product demands action at pre-determined temperature perhaps "Chace" is the answer. May we co-operate with you?

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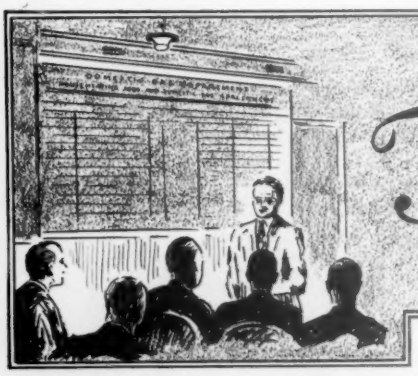


Timely Sales Chats

By William H. Matlack

As we review the past year's activities in the merchandising of gas and gas appliances and gleefully note that 1937 was a year of gains, we cannot forget that there's a job cut out for us in 'thirty-eight.

Master minds in the sales end of the gas business, wherever they meet, are agreed to this. Having reviewed past efforts and projected quotas for new load, and appliances in units that must be sold to attain this load, these men are in common agreement on two things.

One, if we are to successfully compete for and get our share of the customer's dollar, we are going to have to have a more consistent and adequate coverage of homes on existing gas distribution systems. Two, if we are to secure this coverage, we are going to have to increase our manpower. More salesmen are going to have to be employed and assigned to sell and serve a definite number of customers — more efficiently and effectively than they have been served as a general rule in the past.

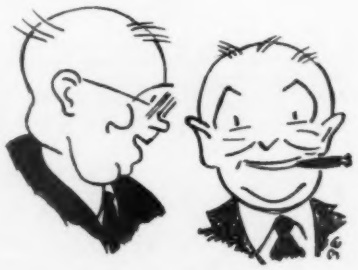
Securing man-power of the proper caliber and integrity to do this job is no task for the odd-jobs man. Good timber is getting harder and harder to find. One way to induce men of the type it takes to do specialty selling to make application is to let it be known that they may expect an equitable compensation—that your company pays well for results.

Good men may be developed quickly in the specialty selling business and they'll stay put if their earning power is based on results obtained.

In devising a compensation plan, plan to pay a flat base salary for doing odds and ends, a commission on merchandise sold, and a bonus for load building—therms added through the sales of appliances. In other words, if we are to secure and hold good salesmen, they will have to be provided with an incentive to do the job we so

much desire. These men must not only be able to sell appliances that build load, get new users and develop new uses for gas service, but they must be able to sell the Company by whom they are employed. They must be able to build lasting good will for themselves in order to sell their customers again and again, and sell the company they work for to the extent that it, too, may have the customer's favorable opinion.

When we secure men of the proper caliber and sell them on the possibilities of our plan—then, it is that the Sales Manager's real work begins. It is the Sales Manager's job to see that the men, who are sent out to represent the Company and sell in the homes of its customers, are properly trained to do the job well. We can no longer afford to employ men by painting potentialities to them, giving them a catalog, an order book, and a price sheet—and, after letting them hang around the store for a day or two, go out onto the firing line as sales-



Master Minds Agree

men to represent our companies and compete for the customer's dollar. These men must be systematically trained. This cannot be done in a day or a week. So, if we are planning to add to our sales force, as we think of spring sales campaigns for more complete coverage of our gas distribution systems, let us first of all sit down and calmly, carefully plan how we are going to train these men. Any man in charge of the Sales Department, especially if he has come up from the firing line, should appreciate the value of and take the time to lay out a complete training course for the men he employs. He will have to put a lot of time not only on the plan, but into its execution—but, he should remember that it will save him many a headache and make his job a more pleasant and profitable one once it gets in swing.

An Approach from Columbus, Ohio (10"—3 Col.)

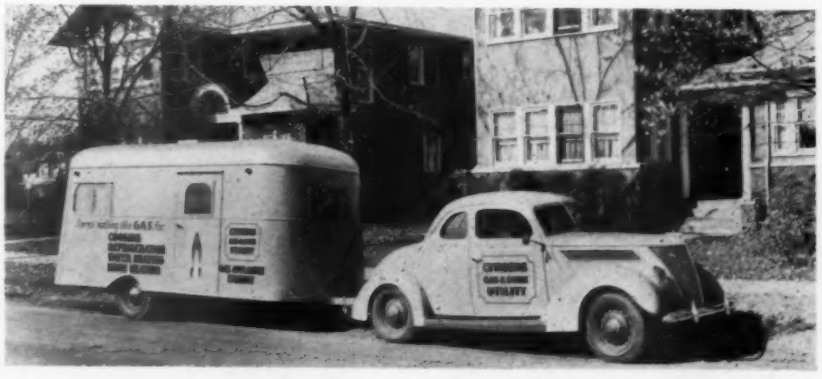
*Jones, Advertising Manager. Don't you think they were effective ** McCall's Miss Octavia Engros is offering a tag for use on gas ranges that looks like a potent piece of promotion material. It might be called a "six rule tag" as it gives six (and heaven knows there's three times that many) rules for using the gas range efficiently ***

Another Approach from Illinois (10"—3 Col.)

*"Magic Chef" says, "A government survey, recently conducted in St. Louis, uncovered the fact that only 30 of 400 homes visited in that city on the west bank of Ol' Man River had modern gas ranges." We bet this survey was made before B. F. Pichard and George Slaughter took up headquarters at Laclede Gas Light Company ** "Gas Exhibits, Inc." is the name of a cooperative, non-profit enterprise that will promote gas and gas appliances at New York's World's Fair next year ** They tell me that the gas industries' national ads reach 18,260,000. persons every time they are published—that's a lotta people to get to thinking about modern gas appliances ** Again this month we reproduce a couple of recent gas appliance advertisements — look them over—they may contain an idea for you ** "Silent Night—and day"—that was a honey, (Servel's Christmas Poster), and here's a*

*Next month, the editor willing, we will have something to say regarding the projection of load building quotas—but now we must be on with our chats. This brings us to Elmer Wheeler's "Tested Selling Sentences" a new, to us at any rate, book that might interest you advertising men and sales managers.**

*Reviewing reports of selling from here and there, we find in our research for results some spirited selling. The Gas Service Company in a cooperative range sale in Western Missouri and Kansas rang the cash register bell for 1231 ranges in eight days—a free turkey with each range turned the trick ** The Manchester Gas Company (Manchester, New Hampshire) recently gave 50,000 persons an effective message on modern gas appliances via a booth in connection with that city's "Parade of Progress." Good exhibits implant the ideas but they must be good ** The two effective advertisements used to tone up our page in the January "Journal" were advertisements used by U.G.I. in a number of their properties and originated at 1401 Arch Street, Philadelphia, in the office of G. M.*



The Trailer Idea is not New but Very Effective.

*palm to the Allentown-Bethlehem Gas Company for capitalizing on it at their Electrolux meeting ** The Citizens Gas and Coke Company, Indianapolis, uses a trailer to take gas appliances to the homes of prospective purchasers in suburban areas. The trailer is not a new idea, but it's an indispensable one where the sometimes neglected suburban areas are to be covered ** The Public Service Company of Northern Illinois sponsored a "Blue Flame Week" Exhibition staged at Forest Park, Evanston and Chicago Heights, Illinois, December 7-11, at which they had a registration of 22,000. * * Conducting demonstrations and holding expositions may be old stuff, but they do get results, for folks still like to "look and lissen."***

* *Address on request to the Editor American Gas Journal.*

New Equipment and Appliances

Full Vision Gas Mask

Full vision lenses, which permit the wearer to see, read, work, walk and observe surroundings in safety, feature the new full vision gas masks manufactured by the Acme Protection Equipment Company, 2661 Koppers Bldg., Pittsburgh, Pa. The lenses are made of scatterproof laminated polished plate glass and afford 90° vertical and 170° lateral vision.

Canister Gas Mask

These new canister masks are available in both corrugated tube and snout types. The light weight, all-rubber face piece is fully molded and cured to master face fitting proportions.

Elimination of the build-up of used (exhaled) air in the fresh air ducts is accomplished by employing one way flap valve ends on the fresh air ducts which close upon exhalation. Available with a variety of head harnesses and a wide selection of canisters covering organic vapors, acid gases, ammonia and industrial smokes, etc.

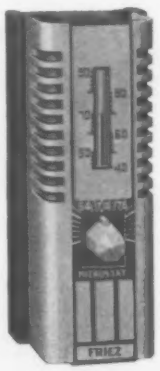
Portable Pyrometer

A millivoltmeter-type Portable Indicating Pyrometer is offered by The Bristol Company, Waterbury, Conn., for measuring temperatures up to 3000° F., using a thermocouple and extension leads.

Use of a cobalt magnet allows exceptional design features — including increased sensitivity and a widened scale for more accurate readings. Unusual sensitivity is accomplished without the need for critical leveling adjustments and with no sacrifice of ruggedness. The high-resistance millivoltmeter movement is double-pivoted and completely shielded to prevent the effects of stray fields.

Bristol Pyrometer

The molded Bakelite case is of moisture- and dust-proof construction, and of modern design. The instrument is available in single and in double ranges. It is especially adapted for industrial use.



Friez Microstat

New Roper Ranges

Included in the several new 1938 models of Roper ranges is the Super DeLuxe unit shown below, the "Yorkshire" which embraces new features in individuality and styling. It includes simmer-speed burners with staggered top arrangement giving ample room for four large utensils. Heavy insulation completely surrounds oven and broiler. The burners provide for low simmer flames needed for flavor-seal "waterless" cooking or any high heat flame desired. The tops of other types include the grouped or separated four burner, the six burner or eight burner. Finish is white or ivory enamel with red, white, black, green or blue handle trim.

"The Yorkshire"

Friez Microstat

Especially designed to meet the modern requirements of automatic heating and cooling control where a very sensitive yet rugged, inexpensive and small sized Thermostat is required.

Suitable for any surrounding and only 3½" high, 1½" deep, and 1½" wide. The instrument is very simple to install and it operates on **two low voltage wires only.** This unique Thermostat incorporates the new "Alnico" sintered magnets of great strength and permanency. The Friez Microstat has a pressed metal case whose standard finish is a rich ivory color and also a plastic base. Low voltage used on these instruments guards against any possibility of electric shock in domestic applications and has obvious advantages from an installation point of view.

Made by Julian P. Friez & Sons, Inc., Baltimore, Md.

News of the Industry

Dana D. Barnum Re-elected President of American Standards Association

Dana D. Barnum, past-president, American Gas Association, was re-elected president of the American Standards Association, and Edmund A. Prentis of the firm of Spencer, White & Prentis, Inc., was re-elected vice-president. The results of the election were announced at the Annual Meeting December 1.

Mr. Barnum has served as a member of the ASA Board of Directors since 1933, and as president of the Association for the past two years. Mr. Prentis was nominated as a member of the Board by the American Society of Civil Engineers in June, 1935 and has served as vice-president during 1936 and 1937.

In his annual report Mr. Barnum made the following significant comments on cooperation between government and industry.

DANA D. BARNUM
Photo Saromy, Boston

"I believe that the most important accomplishment of the Association to date is in the field of industry-government relations. A mutual confidence and understanding has grown out of the many undertakings in which industry and government have labored together. This is true of state and federal governments, and now increasingly of the cities.

"After forty years experience in utility work, I have come to regard the work of this Association on standards which involve governmental regulation as an outstanding achievement in the field of the relations between industry and government. There are innumerable problems which industry can readily solve if it will but take the initiative and follow the same fair methods that it has taken in ASA safety code work. This is an opportunity and a challenge."

Paul Herring Heads Personnel Practices Committee

To head the Committee on Personnel Practices of the American Gas Association for the year, President N. C. McGowen has appointed a man who has spent his business career with The Peoples Gas Light and Coke Company, Paul W. Herring. Twenty-nine years ago Mr. Herring started as a clerk in the distribution department, subsequently organizing the

PAUL HERRING

stores accounting and payroll departments, and thereafter for some twenty-five years dealing with and developing personnel activities with the company.

For the past thirteen years Mr. Herring served as assistant to vice-president in charge of public and industrial relations, with responsibility as to employment, training, employee representation, suggestion system, safety and medical activities, also customer relations activities with respect to general service (complaints). Last August Mr. Herring was made director of Employee Relations of his company. He has been actively interested in committee work of a number of local and national organizations, including Chicago Association of Commerce, American Management Association, Industrial Relations Association of Chicago and the American Gas Association.

Organized less than two years, the Committee on Personnel Practices is rapidly earning an enviable reputation both within the gas industry and elsewhere. It is made up of specialists in the important field of industrial relations, the handling of men, frequently ranked with finance, production and sales as a function of management. The 1937 report of the committee contained comprehensive studies on training, employee retirement systems, employee finances and life insurance plans. The demand for copies of the report has been extensive, many requests coming from other than utility companies.

A.G.A. Refrigeration Committee Headed by H. R. Sterrett

H. R. Sterrett, president of the New Haven Gas Co., New Haven, Conn., known throughout the gas industry for distinguished services in backing progressive policies by gas utilities, has been made chairman of the American Gas Association Refrigeration Committee for 1938, this being the first time the president of a gas utility has headed the Committee. The Committee, in collaboration with the Association of Gas Appliance

H. R. STERRETT

and Equipment Manufacturers and Servel, Inc., makers of the Servel Electrolux gas-operated refrigerator at Evansville, Ind., sponsors gas refrigeration sales campaigns as a means of building up the gas load of those utilities which include refrigerators in gas appliance selling. Mr. Sterrett was formerly president of the Des Moines, (Iowa) Gas Co., and has been affiliated with other important gas companies in an engineering or executive capacity. He is prominent in the American Gas Association, a past president of the New England Gas Association, and a leader in business and civic organizations in New Haven. He is a native of Philadelphia and an alumnus of the University of Pennsylvania from which he was graduated with an engineering degree in 1911.

Liquefied Petroleum Gas Association

At a meeting of members of the National Bottled Gas Association in New York on January 19th, the Association voted to change its name to Liquefied Petroleum Gas Association, and adopted appropriate revision of its constitution and by-laws, consistent with the change in name.

The Liquefied Petroleum Gas Association will hold its first meeting at St. Louis, Mo., on March 21st and 22nd, 1938. At that meeting officers will be elected and an Executive Board chosen for the current year.

Organization is now proceeding rapidly to classify members of the Association so that procedure of receiving nominations for officers may be completed prior to the March meeting. This reorganization is heralded as an important step forward, and establishes the association as one that represents the entire bracket of interest of the liquefied petroleum gas industry. Southwestern and Midwestern sections have already been established and plans are fast developing for recognition of sectional sub-divisions in other territories, especially in the East and West.

The Association was organized in 1930 and has performed a very useful and helpful service to the petroleum gas industry. It is affiliated with the Compressed Gas Manufacturers' Association, Inc., which incidentally celebrated its 25th Anniversary in January.

Officers of the Liquefied Petroleum Gas Association are W. F. Verkamp, President, F. B. Boice, Vice-President, A. N. Kerr, Vice-President, and F. R. Fetherston, Secretary and Treasurer. Headquarters are located at 11 West 42nd Street, New York City.

Food For Thought

1. 20,000 miles of mains surveyed.

2. 14,000 new gas leaks located.

3. 40,000 valuable reports made on trees and shrubs.

4. 150 companies using the service.

5. Enough savings in unaccounted for gas to pay the bill.

6. A trial will convince you.

May we hear from you?

New England Forestry Service Inc.

75 Federal St., Boston, Mass.

CONVENTION CALENDAR

February

3-4 *A.G.A. Eastern Natural Gas Regional Sales Conference*, William Penn Hotel, Pittsburgh.

10-12 *A.G.A. Mid-West Regional Gas Sales Conference*, Palmer House, Chicago.

16-18 Combined Annual Meeting, *Southern Gas Association* and *Southern-South Western Regional Gas Sales Conference of A.G.A.*, Hotel Adolphus, Dallas, Texas.

24-25 *New England Gas Association*, Annual Business Conference, Hotel Statler, Boston.

March

7-8 *A.G.A. National Conference on Industrial Gas Sales*, William Penn Hotel, Pittsburgh, Pa.

21-22 Liquefied Petroleum Gas Association, St. Louis, Mo.

April

4-6 *American Gas Association*, Distribution Conference, Netherland Plaza, Cincinnati, Ohio.

11-13 *Mid-West Gas Association*, St. Paul, Minn.

18-21 *American Chemical Society*—Division of Gas & Fuel Chemistry, Dallas, Texas.

20-22 *Missouri Association of Public Utilities*, St. Louis, Mo., Jefferson Hotel.

May

3-5 *Pennsylvania Gas Association*, Annual Convention, Sky Top, Pa.

9-12 *A.G.A. Natural Gas Department*, Roosevelt Hotel, New Orleans, La.

14-21 *International Petroleum Exposition*, Tulsa, Okla.

23-24 *A.G.A. Commercial and Hotel & Restaurant Sales Conference*, New York, N. Y.

24-26 *A.G.A. Production & Chemical Conference*, Hotel Pennsylvania, New York.

25-28 *A.G.A.E.M.* Annual Convention, White Sulphur Springs, W. Virginia.

June

9-10 *Canadian Gas Association*, Annual Convention, Royal York Hotel, Toronto. (No exhibits.) G. W. Allen, Secretary - Treasurer, Astley Avenue, Toronto, 5.

23-24 *New England Gas Association*, Sales Conference, Viking Hotel, Newport, R. I.

October

10-14 *American Gas Association*, Annual Convention, Atlantic City. (No exhibits.)

A.G.A. Hotel, Restaurant & Commercial Sales Conference to Be Held in New York in May

Always one of the highlights of the year the A.G.A. Hotel, Restaurant and Commercial Sales Conference for 1938 will be held in New York City at the Belmont Plaza Hotel, Monday and Tuesday, May 23 and 24. This is the annual gathering of gas utility men and appliance manufacturers interested in the promotion, sales and servicing of hotel, restaurant and lunchroom cooking, as well as other commercial gas apparatus. Representatives of gas companies serving both manufactured and natural gas will be present. This year as in previous years, attendance will be from all over the country.

Modernization of commercial kitchens, a national program that has been aided and promoted by the gas utilities in recent years, is gaining momentum. One authority estimates that close to $9,000,000 will be spent in modernizing hotel kitchens alone this year. And, of course, the chief item in kitchen modernization is new and up-to-date cooking equipment. Commercial and industrial gas sales have been at an all time high for the past two years and indications are that the volume of this send-out will be on the increase for some time to come.

Hale A. Clark, Detroit City Gas Co., is Chairman of the Industrial Gas Section under whose auspices the Conference will be held. Plans for the conference are being made by the Program Committee, Franklin T. Rainey, The Ohio Fuel Gas Co., Chairman, and W. Jennings Young, Oklahoma Natural Gas Co., Tulsa, Okla., Vice-Chairman. They will be assisted by a sub-committee of which Joseph F. Quinn, The Brooklyn Union Gas Co., Brooklyn, N. Y., is Chairman, and by E. H. Poe, Dallas, Texas, secretary, Natural Gas Department, American Gas Association. There will be important papers and several symposiums on subjects of vital interest to those attending and sales will receive special consideration. Several of the committees of the Industrial Gas Section will hold meetings on the day following this conference.

Maddux Represents Eclipse Fuel in N. Y. C.

O. L. Maddux has been appointed New York City representative of the Eclipse Fuel Engineering Co., Rockford, Ill. Mr. Maddux during the past ten years was engineer for the United Gas & Fuel Co. of Hamilton (Ont.), specializing in gas utilization. In this capacity he was responsible for many noteworthy industrial gas applications covering a wide variety of industries.

Mr. Maddux is well known to the Gas Industry through his work on committees in various organizations. Among these are the A.G.A., the A.S.H.V.E. and A.S.M. In his new work as sales representative, his considerable experience in utilization work should prove most helpful. He has opened offices at 53 Park Place, New York.

Gas Industry to Exhibit at the National Convention & Exhibition of Associated Bakers of America

One of the most prominent features of the National Convention & Exhibition of the Associated Bakers of America will be the interesting and instructive display of modern commercial gas equipment sponsored by the Industrial Gas Section, American Gas Association in cooperation with The Peoples Gas Light & Coke Co., Chicago. This convention will be held at the Hotel Sherman, Chicago, February 21 to 24. It is the first time that a program of this kind has been undertaken in the interests of the retail branch of the baking industry and is bound to attract nation wide attention, not only of retail bakers, but also of men representing both the manufactured and natural gas industries. It will fill a long felt need in both these industries.

Prominently displayed in the gas exhibit will be the new commercial gas refrigerating unit, gas heated deck ovens, automatic gas water heaters, deep fat fryers, gas steam boiler applications, etc. In connection with the new commercial gas refrigerating unit, which was launched commercially last year, one gas utility has found it so successful that it plans to sell several hundred in its territory this year.

Hale A. Clark, Detroit City Gas Co., is Chairman of the Industrial Gas Section. The gas exhibit will be organized by the Committee on Displays at National Industrial Expositions, Industrial Gas Section, of which P. Ziegelbauer, Detroit City Gas Co., is Chairman. Thomas J. Gallagher, The Peoples Gas Light & Coke Co., Chicago will be in charge of the booth and he will be assisted by other local gas men and exhibiting manufacturers' representatives.

Electrical and Gas Association of New York Elects Officers

At its annual meeting on January 19th, the Electrical and Gas Association of New York, Inc., elected A. Lincoln Bush as its President, to succeed C. E. Stephens, Vice-President, Westinghouse Electric and Manufacturing Company. Mr. Bush is President of the Belmont Electric Company, Inc.

Other officers elected were: First Vice-President, E. F. Jeffe, Vice-President, Consolidated Edison Company of New York, Inc.; Second Vice-President, J. H. McKenna, Eastern Sales Manager, A. J. Lindemann and Hoverson Company; Third Vice-President, H. H. Cuthrell, Vice-President, The Brooklyn Union Gas Company; Fourth Vice-President, David S. Youngholm, Vice-President, Westinghouse Electric and Manufacturing Company; Treasurer, P. Schuyler Van Bloem; Secretary, S. J. O'Brien, President, S. J. O'Brien Sales Corporation; and Assistant Secretary, H. C. Calahan, District Manager, General Electric Supply Corporation.

The meeting was held at the Association's Electrical and Gas Institute in Grand Central Palace.

The Conferees

Darling in N. Y. Herald Tribune

Tangled Traffic

Today we are confronted with conditions that demand no dilatory attitude. The need is for immediate constructive action by government, labor and industry working in harmony to untangle the present stalemate. Should not the way be cleared so that everyone can go ahead?—Ed.

Sperling Becomes Genl. Supt.

Nathaniel J. Sperling, acting general superintendnt of the Astoria Plant, Gas Production Department, Consolidatd Edison Company of New York, has been made general superintendent of the plant. He has been in charge of the plant since June, during the illness of W. F. Lawrence, who retired recently.

Mr. Sperling was employed as a draftsman in Consolidated Edison's Construction Department in January 1905, and later that year he was transferred to the Manufacturing Department. Since 1906, he has been superintendent of maintenance and construction for the Astoria Plant.

He has been in close touch with the development of the gas industry for many years as a member of the Society of Gas Engineering of New York City, the American Gas Association and the Queensboro Chamber of Commerce.

Cities Service Gas Co. To Supply Electric Plant

The Cities Service Gas Company recently signed a contract with the Oklahoma Gas and Electric Company to furnish part of the fuel requirements of the electric company's Harrah electric plant. The gas company will furnish 25 per cent of the fuel requirements which will amount to approximately 2,530,000 to 5,000,000 cubic feet of gas daily.

The electric plant has a generating capacity of 65,000 k.w. and a boiler capacity of 30,000 H.P.

In order to furnish the plant it was necessary to lay 13 miles of 8-inch pipe line extending from the Oklahoma City 20-inch main. The pipe has been reclaimed from the Atlanta and Elk County 8-inch lines and has all been thoroughly reconditioned and double jointed.

American Society of Heating & Ventilating Engineers Holds 44th Annual Meeting

Stressing the physiological reactions of persons to varying conditions of indoor atmosphere with a view to establishing improved standards of air conditioning, heating and ventilating practice, the American Society of Heating and Ventilating Engineers held its 44th annual meeting in New York, Jan. 24-28 with a record attendance of 1,500 engineers from all parts of the country.

Of sixteen technical papers presented at the meeting, six were devoted to analyzing the reasons why people feel comfortable or uncomfortable in their air environment. Among the conclusions reached were that somewhat higher indoor summer effective temperatures, more economical to produce, are

E. H. GURNEY

acceptable to persons in the warmer climate zones of the country and that conversely lower temperatures are more in demand by people in northern sections.

These facts were brought out in a paper on summer cooling requirements by F. C. Houghten, director of the Society's research laboratory, in which tests on office workers in an air conditioned space were discussed and related to studies of a similar nature made in other parts of the country.

Drs. F. K. Hicks and R. W. Keeton, of the College of Medicine, University of Illinois, described tests in which they found that skin temperatures at the extremities of the hands and feet were of significant importance in indicating the response of the body to its atmospheric environment, especially in its loss of heat radiation.

Dr. C. A. Mills, Professor of Experimental Medicine, University of Cincinnati, presented studies tending to show that "human comfort and animal growth and development can be regulated with what seems apparent satety by control of body heat loss through radiant channels alone."

Among discussions relating to the performance of basic equipment used in heating, ventilating and air conditioning, particular interest centered in a paper describing tests of asbestos insulating air ducts in which claims of improved sound absorbing qualities were made and other questions including frictional resistance, heat transmission and problems of fabricating ducts from asbestos were dealt with. This paper was presented by R. H. Heilman, Senior Industrial Fellow of the Mellon Institute of Industrial Research, and R. A. MacArthur, research chemist, The Philip Carey Mfg. Co.

"Condensation within Walls" was another paper of outstanding interest presented by Professor F. B. Rowley, Director of the Engineering Experiment Station, University of Minnesota and his associates, Messrs. A. B. Algren and C. E. Lund. The marked advances in the science of air conditioning and building construction have presented a troublesome problem caused by the condensation of moisture or the formation of frost in various parts of buildings wherein relatively high humidities are maintained.

E. H. Gurney, of Toronto, Canada, was elected President of the Society to succeed D. S. Boyden of Boston. Mr. Gurney is president of the Gurney Foundry Co., Ltd., of Toronto.

Compressed Gas Manufacturers' Association

The Compressed Gas Manufacturers Association held its 25th Annual Convention at the Waldorf-Astoria Hotel, New York City, on January 17th and 18th. The Convention officially opened with a luncheon on January 17th. Mr. W. J. Willenborg, who has had considerable experience with the use of hydrogen in many applications, including its use in lighter than air craft, delivered an informal talk reviewing the circumstances leading up to the Hindenburg disaster, based upon available evidence following that regrettable catastrophe.

The Association's annual business meeting was held during the afternoon of January 17th. It voted minor amendments in its By-Laws and elected Officers and an Executive Board for the year 1938, as follows: John J. Crowe, President, (Air Reduction Co.); P. F. Lavedan, Vice-President, (Liquid Carbonic Corp.); F. C. Zeisberg, Vice-President, (E. I. duPont de Nemours & Co.); F. R. Fetherston, Secretary-Treasurer.

The entire day, January 18th was devoted to the presentation of a series of papers covering, among others, the following subjects:

"Explosive Ranges of Flammable Liquids," by F. C. Mitchell, of E. I. duPont de Nemours & Co. "The Liquefied Petroleum Gas Industry," (a) Its Birth and Earliest Days, by A. N. Kerr, Imperial Gas Co. (b) Progress and Development, by M. G. Farrar, Carbide & Carbon Chemicals Corp. (c) As to the Future of the Industry, by R. W. Thomas, Phillips Petroleum Co.

In the evening of January 18th the Twenty-Fifth Annual Banquet fittingly terminated the Silver Anniversary Celebration of the Association.

Home Service Directors

Some idea of the comprehensive personnel of Home Service throughout the gas industry may be gleaned from the January, 1938 list of Home Service Directors issued by American Gas Association.

This branch of service headed by Mildred Clark, Chairman of Home Service Committee and Jessie McQueen, Home Service Counsellor, has accomplished much in the promotion of gas and appliance sales through education and instruction among communities from coast to coast.

The list of Company directors and assistants arranged alphabetically by states is indeed impressive. The result of their work is reflected always in the growing figures for gas and appliance sales, not to mention increased good will on the part of the Company customers.

In numbers the list totals over 1,000 including assistants, associated with gas companies in the United States.

Manufacturer companies having individual Home Service Directors total 21.

Without a doubt, quite an imposing array of gas boosters.

Home Service on Regional Programs

Home Service will have a part in the four Regional Conferences and Conventions to be held in February. In Pittsburgh, Mrs. Anne Sutter of the Equitable Gas Company, will have charge of a breakfast program preceding one of the General Sessions of the Sales Conference, Friday morning, February 4. In Chicago, the Saturday morning program and luncheon, February 12 will be under the supervision of Mattie Rouse of the Consumers Gas Company, Flint, Michigan.

Margaret Marable of the Lone Star Gas Company in Dallas will preside at a morning session of the Southern Gas Association program Thursday, February 17. In the New England Gas Association the Home Service Committee will have a luncheon program arranged by Mrs. Eleanor Kingsley of the Worcester Gas Light Company at Framingham at their convention in Boston, February 25.

Programs for these home service meetings will be mailed out very soon.

The Outstanding Gas Purifying Material » » »

Highest H_2S removal combined with complete removal of traces. Physical structure insures very low box back pressures.

THE RECOGNIZED PURIFYING MATERIAL FOR VAPOR PHASE GUM CONTROL.

Ask for our new bulletins Nos. AL-18-19 which are very interesting

THE ALPHA-LUX COMPANY, Inc.
192 FRONT ST., NEW YORK
Philadelphia **Chicago**

TITAN WATER HEATER CONTROLS

AGA Approved TITAN Temperature and Pressure Relief Valve

This device is installed on the hot water outlet in the tank directly in the flow of water. Action, as a result, is unfailing and positive, there being no dead pockets to prevent proper functioning of relief valve.

Pressure relief is obtained through a spring-loaded valve which opens when the pressure reaches a predetermined point. Should the water become overheated to 200° F, a fusible disc melts and lets the water escape thereby preventing a further increase in temperature.

The Titan Relief Valve serves as a coupling connected in the line thereby eliminating the necessity and expense of a tee fitting. To replace fusible disc, it is not necessary to disassemble valves or piping in any way.

Designed for application to storage or range boilers. Prevents corrosion, scalding and explosion.

Catalog and full information upon request.

The Titan Valve & Manufacturing Company

Thermostats • Safety Pilots • Relief Valves • Safetystats
9913 Elk Avenue Cleveland, Ohio

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR
ALL MAKES — ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

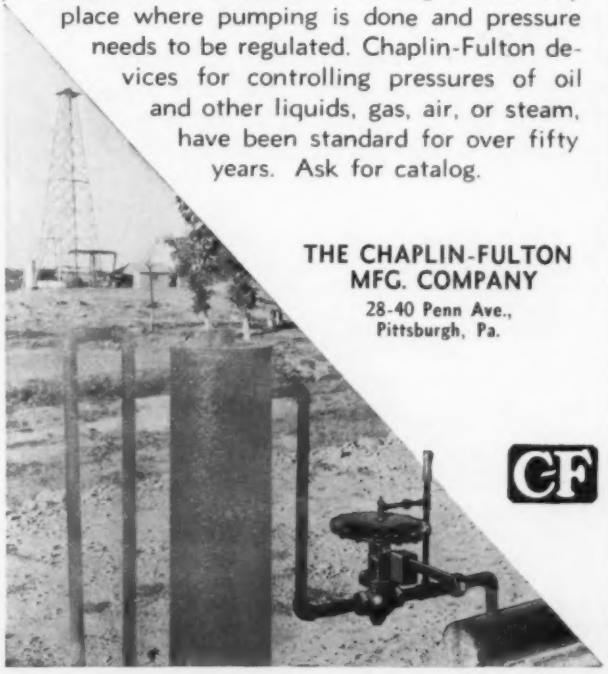
— 0 —

LAMBERT METER CO.
BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

"ON LOCATION"

And Giving A Smooth Performance

This Fulton Low Pressure Regulator is at work on the gas fuel line of a pump drawing oil from a deep well in Oklahoma. It might be in any place where pumping is done and pressure needs to be regulated. Chaplin-Fulton devices for controlling pressures of oil and other liquids, gas, air, or steam, have been standard for over fifty years. Ask for catalog.



THE CHAPLIN-FULTON MFG. COMPANY
28-40 Penn Ave.,
Pittsburgh, Pa.

CF

The Gas Industries Exhibit Gets Under Way

The ceremonial of driving the first pile for foundations of the $750,000 Gas Industrial Exhibition Building now being erected for the New York World's Fair 1939 took place on January 18th. A dummy of "Old Man Recession" was dumped head first into the hole prepared, and the pile then driven home accompanied by much ceremony. Two Fair girl guides, one shown on the left, released the ribbon on the pile. Appropriate addresses were made by Hugh H. Cuthrell, president of Gas Exhibits, Inc., at the microphone, and Grover A. Whalen, president of the Fair, who appears on the right. It was a cold day but warm with enthusiasm.

Berghorn, secretary of Gas Exhibits, Inc.

Other members of the board of Gas Exhibits, Inc., present were A. J. Gonnoud, president, Kings County Lighting Co., Brooklyn, N. Y.; George A. Humphrey, general manager, General Gas Light Co., Kalamazoo, Mich.; H. N. Ramsey, president, The Welsbach Company, Philadelphia, and F. E. Sellman, vice-president, Servel, Inc., N. Y.

Others were Louis H. Skidmore, architect, Skidmore and Owings, John Moss, Associate, New York; Maximilian Moss, counsel for the Brooklyn Union Gas Company; Kurwin R. Boyes, secretary, American Gas Association, New York, and other notables attended.

Gas Exhibits, Inc., is a non-profit group formed by leading gas appliance and equipment manufacturers and gas utilities in all parts of the United States which will plan and develop the part which the gas industry will take at the New York 1939 World's Fair. Headquarters of the organization are at 60 East 42nd Street, New York.

World's Fairs East and West

Construction Starts on Gas Industries Buildings

Mr. Whalen declared that start of construction of the gas industries building was of particular significance, both to the Fair and to the business and industrial community. It marked, he said, the first physical step in the parade of American business and industry to the Fair.

The gas industries building, occupying more than two acres adjacent to the main Shelter Building, will contain 30,000 square feet of exhibit space for displays and demonstrations. Features will include a laboratory, a model all-gas house, a theatre and a club.

Gas will be the sole illuminant for the structure, and even the golden-toned stucco exterior will be floodlighted by gas. Guarding the main entrance court will be four flaming pylons, each 90 feet high, grouped around a 50-foot gas flame which will roar skywards from a huge cube representing 1,000 cubic feet of gas.

Architects of the building were Skidmore & Owings, John Moss, Associate, while the engineers are Morgan, Hamel & Engelken. Construction is in the hands of Wood & Hagan, and Michael Rapuano is in charge of landscaping.

Among those who joined in the ceremonies, other than Mr. Cuthrell and Mr. Whalen were W. T. Rasch, vice-president of Gas Exhibits, Inc., and president of the American Gas Products Corp., New York; N. T. Sellman, treasurer of the exhibiting company, and assistant vice-president of the Consolidated Edison Company of New York, and C. W.

San Francisco 1939 Fair Will Show Ancient Use of Gas

Novel and picturesque will be "China Village," a reproduction of an ancient Chinese wall city at the 1939 Golden Gate International Exposition. "Good Earth" village with its huts, shops, markets, etc., will reveal how the ancient Chinese used natural gas for cooking by placing a large inverted funnel over the gas well and conveying the gas through bamboo tubes jointed with lead couplings. The burner tip of iron was placed immediately under a wok (cooking vessel). American born Chinese are financing this display, part of which is shown in the above architectural study by Mark Daniels and Ralph Owen.

Subway Sniffers

Here a sniff, there a sniff
Everywhere a sniff sniff

Samuel Turner, one of the four "subway sniffers" employed by the Consolidated Edison Company of New York, Inc., was featured on the Fred Allen "Town Hall Tonight" radio program on January 5th. In this series of broadcasts, sponsored by Ipana Toothpaste and Sal Hepatica, and broadcast over the Red network of the National Broadcasting Company, Mr. Allen, in his insouciant style, interviews before the microphone people who have unusual jobs.

Fred Allen, on the left, asks Mr. Turner—"does a cold in the head cramp your style?"

The radio dialogue brought to light the activities of this unusual profession which calls for a keen olfactory sense particularly with reference to city gas.

Four sniffers patrol these sections of the subways, 24 hours a day, where gas distribution lines lie adjacent to the tunnel Stopping off at each station, they take healthy sniffs at each end of the platform as trains arrive and depart; then pass on to the next station taking a few extra sniffs from the front of the train en route.

It is a safety precaution in the event that a bad leak might become ignited by a spark from the third rail, though leaks are seldom found.

During eight years of subway sniffing Mr. Turner related that he had detected but one serious leak and took immediate steps to correct the situation through the emergency department of the Edison Company.

Franchise for Chattanooga

A new thirty-year franchise was granted by ordinance finally passed by the board of city commissioners of Chattanooga on December 28, after the adoption of an amendment stipulating that actual construction work on a system for natural gas must begin within eighteen months. The alternative is revision to the old franchise which expires in 16 years.

When the gas franchise ordinance was introduced several weeks ago, officials of the company, announced that they planned to bring natural gas to Chattanooga, and that it was contemplated that an expenditure of approximately $1,000,000 would be necessary in making the change-over and in extending the service.

Since the old franchise was to expire in 1953, a forty-year franchise was asked originally but Commissioner R. M. Cooke objected and the ordinance was subsequently amended to read "thirty years."

Gas in the Movies

Metro-Goldwyn-Mayer has completed a sequel to "Penny Wisdom," the Pete Smith technicolor comedy released last Spring which featured Prudence Penny and all gas equipment. The new picture is called "Penny's Party" and shows Prudence Penny preparing all sort of palate-tickling dishes with the aid of the latest model of gas range and gas refrigerator.

The new picture will have first run at Loew Theatres but the release dates have not been selected as yet. Companies will be advised later as to bookings and suggested ways of tying-in their sales promotional work with the picture.

Cribben & Sexton Officers

Cribben & Sexton Co., range manufacturers of Chicago announces the elections of Frank J. Hoenigmann Vice-President in charge of sales; George E. Keenen, Vice-President and Eastern Manager; David H. Rowe, Assistant Treasurer.

INDUSTRIAL GAS BOILERS

Tubular or Flueless
¾ to 45 H.P.

P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

Alloys for Severe Usage

The past year has seen a strongly established trend toward the use of alloys of special compositions for specific service requirements. This has been notably true in the field of materials for use under extremes of corrosion and wear.

Included are alloys developed for economical use under exposure to such severely corrosive substances as hydrochloric acid, sulphuric acid, inorganic acid salt solutions and strong oxidizing agents like wet chlorine. Alloys for many heavy machinery applications involving severe abrasion, with or without impact, have also risen to greater prominence.

Outstanding among corrosion-resistant materials has been the introduction of the nickel-molybdenum-iron alloy known as "Hastelloy B" which possesses unusually good physical properties coupled with exceptional resistance to the action of all concentrations of hydrochloric acid at temperatures up to and including the boiling point. Its strength is comparable to a strong alloy steel, and it can be rolled and formed into sheets and plates.

The corrosion resistance of this alloy in 20 per cent boiling hydrochloric acid, the rate of penetration is stated to be only 0.0016 in. per month. Such resistance assures permanency of equipment and reduction in shutdowns for replacement.

Hastelloy B is supplemented by two other alloys of the Hastelloy series, alloys A and D. Hastelloy A is being more and more widely employed for equipment handling hydrochloric acid at temperatures up to 60 deg. C., while alloy D has been adopted by a large number of chemical manufacturers for sulphuric acid service, especially in acid concentrators, pumps, and valves.

Hastelloy C, composed of nickel, molybdenum, chromium and iron, is being used to handle severely corrosive media that cannot be adequately handled by the high-chromium steels or similar materials, for instance, such strong oxidants as hypochlorites, or chlorine containing moisture.

An interesting application requiring alloys having resistance to both wear and corroson is that of automatic check valves for stopping the reverse flow of oil in pumping wells. The combination of valve balls ground from castings of Hastelloy D, an acid-resistant alloy, together with seat rings hard-faced with Haynes Stellite, a hard facing alloy, has proved especially suitable for handling high-sulphur crudes, which are corrosive, and, in the case of sand-carrying oils, abrasive as well.

These special alloys are products of Haynes Stellite Co., 205 E. 42nd Street, New York and Kokomo, Indiana.

Edwin C. Hill, well known news commentator, says: "Some dances get hot slowly like electric cook stoves and concert violinists, but the 'Big Apple' is like a gas stove or a temperamental opera singer—it bursts into immediate flame."

Canadian News

Chairman Farrah of No. 3 Committee of the city council of St. Thomas, Ont., reported at a recent meeting that the use of natural gas for heating the greenhouse boilers at Pinafore Park is proving more economical and efficient than coal. The boilers are under thermostat control and as the greenhouses are heated by the sun's rays on the glass, the quantity of gas being used is automatically reduced.

The Central Pipe Line Co., Chatham, Ont., is planning to supply natural gas for the heating of the hundreds of tobacco kilns in the tobacco growing area at Glen Meyer. It is claimed that gas will be safer and cheaper than the wood-burning equipment at present in use and which often results in disastrous fires.

The Oxford County Council of Woodstock, Ont., at its recent meeting passed a by-law transferring the agreement between the county and the Aloka Gas and Oil Co. of Toronto, to the Oxford Pipeline Co., providing for the running of a pipeline along county roads from Brownsville to Ingersoll. The company will supply natural gas to Dereham township residents at 55 cents a thousand feet, or 30 cents a thousand feet if the consumer provides his own piping and connections.

Gas, coke and by-products made in coke and gas plants in Canada during 1936, had a value of $39,871,898 compared with $38,474,789 in 1935. In 1936 the coke production amounted to 2,404,793 tons valued at $16,710,008 at the works; gas sold and used by the producers totalled 44,482,988 thousand cubic feet worth $20,219,359, and by-products were worth $2,942,531.

Thirty-nine coke and gas works were in operation in Canada during 1936, including 8 by-product plants, 2 beehive plants, 21 retort coal gas and water gas plants, and 8 establishments for making pintsch oil gas for lighting railway cars. Besides these manufacturers, three gas distributing companies were in operation, who purchased coke-oven gas from the producers and distributed it for domestic and commercial use.

Sales of artificial gas totalled 15,279,272 thousand cubic feet valued at $14,751,970. The number of meters active during 1936 was 521,371: the distributing mains were 3,785 miles in length and served about 3,310,823 of Canada's population.

Data on the distribution of coke shows that 247,744 tons of coke were used in the coke and gas plants for fuel or for making water gas and 381,443 tons were sold for other uses. The total distribution of 2,500,063 tons in 1936 included about 95,270 tons drawn from stocks.

The Chemical Division of the Federal Government's National Research Laboratories has done much during the past year in relation to the possible utilization of Alberta's natural gas, which, in many districts are going to waste. Experiments are being performed to determine the commercial value of the gas in the production of ethylene, a starting material for the manufacture of industrial alcohol. Further work is being done to produce "stabilizer" gas from the waste gas in the Turner Valley field. Three to four gallons of benzene have been made from a thousand cubic feet of gas, which when blended with gasolene yields a very satisfactory motor fuel.

New Construction for Koppers

Koppers Company has been awarded a contract by the Dominion Steel and Coal Corporation to modernize its light oil recovery plant at the corporation's coke ovens at Sydney, Nova Scotia, Canada. The amount of the contract was not revealed. Work will require about four months.

Koppers Company also has just been awarded a contract for the erection of a battery of 69 modern low differential Koppers-Becker ovens with self-sealing doors for Republic Steel Corporation at Youngstown, O.

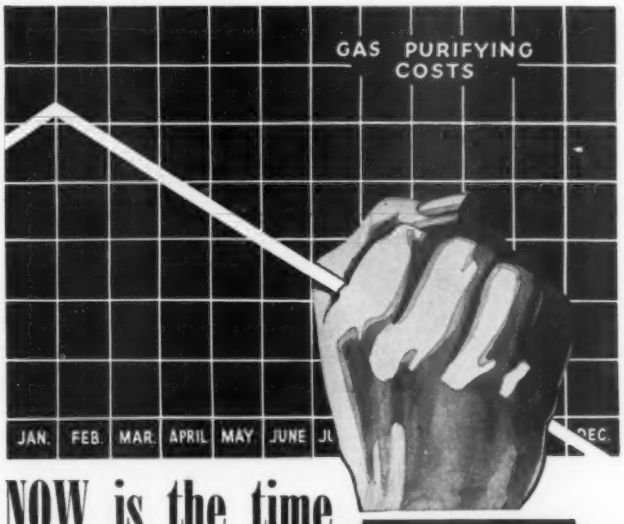
The new ovens will replace 61 old ovens and will increase coke production about 15 per cent to 90,000 tons a month. They will be ready for operation about Sept. 15.

Additional equipment to modernize Republic's by-product plant also will be provided by Koppers Company.

The under-jet Koppers-Becker ovens for American Rolling Mill Company at Hamilton, O., for which a contract was awarded recently, will be completed late next summer.

Officers and Department Heads of Pittsburgh Equitable Meter Co., and Merco Nordstrom

A dinner was tendered by Colonel W. F. Rockwell, President, to some 80 officers and various department heads of Pittsburgh Equitable Meter Company and Merco Nordstrom Valve Company, on December 27, at the Pittsburgh Athletic Association. Colonel Rockwell in his address, reviewed the progress of the two companies during the past year and the prospects for the future. Short talks were made by F. B. Wolfe, Vice President; E. W. Meyers, Treasurer; Capt. A. E. Higgins, Vice President; Walter Parker, Factory Manager; Carl Dixon, Shop Supt.; Allen D. MacLean, Chief Engineer, and W. H. Newbaker, Purchasing Agent.



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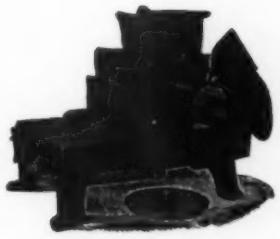

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Cedar Rapids IOWA

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GAS HOLDERS

HOLDER INSPECTION

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TANKS, BINS, FLUES PURIFIERS, WELDINGS

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The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

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Connelly Distribution Products meet all requirements of gas systems—Station, District, Service and Appliance.

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Chicago, Ill. Elizabeth, N. J.

Catalogs

Condensers. Bulletin issued by Condenser Service & Engineering Co. of Hoboken, N. J., describes the principles and application of an air and erosion eliminator designed to reduce failure of condenser tubes by removing the cause of tube end destruction. Copy on request.

Electric Welding. "How to Change Over to Welded Design for Profits" is the title of a new 32-page, 8½" x 11", profusely illustrated bulletin published by The Lincoln Electric Company, Cleveland, Ohio. Intended as an aid in applying electric welding to the design of machines and machinery structures, the new bulletin sets forth the experiences of many manufacturers who have redesigned their products for arc welded construction.

Boiler Regulation. The Brown Instrument Company has just published catalog No. 5001 on the Brown Automatic Boiler Regulation System, a Position Type of Combustion Control System. It is designed for boilers under 1,000 h. p., operating at pressures up to 300 lbs. and consists of steam damper regulator, over-fire control, control valves and accessories. Copies of this catalog are available to power plant engineers, operators and others interested in combustion control. Write the Brown Instrument Company, Wayne and Roberts Avenue, Philadelphia, Pa.

Controls. A new 24 page catalog of automatic heating and air conditioning controls has just been published and offered to the trade by the General Controls Company. Engineering data, wiring and installation diagrams are included.

Three new products are described, a line-voltage Metrotherm room thermostat, Automatic Thermocouple Pilots and a new series of Pilot Burners. More complete information is also given on the General Controls line of solenoid valves, thermostats, damper regulators, transformers, strainers, and switches. A copy may be had by writing to General Controls, 450 East Ohio Street, Chicago, Illinois.

Acid-Proof Cement. Quigley Co. Bulletin A. P. 122-R describes a line of Acid-Proof Cements used for bonding brickwork of industrial chimneys, acid towers, pickling tanks, cooling towers; laying up vitrified or other wall tile in battery rooms, laboratories; lining tile or bell-and-spigot joints of building and residence chimneys; patching flue linings; pointing up ordinary clay mortar joints disintegrated by acid action.

This 8-page bulletin can be obtained from the manufacturers, Quigley Co. Inc., 56 W. 45th St., New York.

Thermometers. Bulletin, 198-1, just issued by The Foxboro Company, Foxboro, Mass., is free from technicalities and interesting in arrangement. A brief story on the value of thermometers is followed by separate descriptions of the thermometers associated with the Foxboro trade mark. The story of each class is complete and continuous. Its appearance, its range characteristics, its thermal system and its special bulbs are all illustrated and described within the limits of four pages. The same plan is followed for other sections of information. Everything is grouped under easily recognizable headings.

Men who know little of thermometry and men who have used thermometers all their lives will equally find this bulletin easy to understand and to handle. Send to Foxboro for a free copy of this valuable bulletin.

Pyrometers. Catalog, No. 1101-D, of C. J. Tagliabue Mfg. Co. describes and illustrates many unique features of indicating, recording and controlling pyrometers and resistance thermometers, which utilize a phototube, mirror galvanometer and a beam of light. This construction offers instantaneous action, close accuracy and high sensitivity. Large illustrations showing the mechanisms of various models are clearly marked, and thus provide quick understanding of the instruments' operation. Copies will be sent free by addressing the Company, Park and Nostrand Avenues, Brooklyn, N. Y.

Gas Boosters. Bulletin No. 109 of Spencer Turbine Co., Hartford, Conn., describes their gas boosters made in standard designs ranging from 8 oz. to 5 lbs. pressure with capacities from 100 to 20,000 cu. ft. per minute. These units with unusual mechanical features are direct motor driven employing 25, 50 or 60 cycle A.C., or D.C. motors of any standard voltage.

Industrial Air Conditioning—Bulletin C. E. 103 of Carrier Corporation, Syracuse, N. Y., illustrates and gives details of Carrier industrial air Conditioning, refrigeration and space heating equipment. Applications for cooling and storage and auxiliary equipment are included.

Weather Instruments—General Catalog No. 6 of Julian P. Friez & Sons, a comprehensive volume of over 100 pages, deals chiefly with Meteorological and Hydrological Instruments, though reference is made on pages 44 to 47, and pages 50 to 55, inclusive, to instruments for the automatic control, indication, and recording of indoor air conditions. Air conditioning indicating, controlling and recording instruments are well described, illustrated and priced in an 8-page condensed Bulletin K. Copy may be had by addressing the company at Baltimore, Md.

Gas Regulators—Bulletin 3358 of The Chaplin-Fulton Manufacturing Co., 28-40 Penn Ave., Pittsburgh, Pa., describes house service and high pressure gas regulators and the Fulton Weighted Illuminating Regulator.

Valves.—Bulletin 4146 of the same Company high pressure, soft seat and "V-Port" inside valves to prevent regulator freezing.

Flowmatic Regulator.—Bulletin 409-A issued by Northern Equipment Co., Erie, Pa., describes the Copes Flowmatic Regulator designed to give accurate, dependable feed water control for boilers handling rapid, wide load fluctuations. Schematic drawings in color show method of operation.

Thermostat—Bulletin S. A. 775 of Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., illustrates and points to the seven outstanding advantages of "National" equipment which includes pneumatic, electric or combination controls. Detailed description of the "Helmet Seal" thermostat is given.

Heating Systems. "Don't Be Hoodwinked," is the title of a new 8½ x 11, 16-page well illustrated bulletin admonishing the prospective home owner not to "Buy A Pig In A Poke" when selecting a heating system. It presents a fair and vivid comparison between warm air and radiator heating. It discusses the various functions of air conditioning from the standpoint of practicability. The arguments are presented in a straight-from-the-shoulder, nontechnical manner easily understood by the layman.

It sells the real merits of radiator heating . . . and is a sales help that the heating contractor has been patiently waiting for.

Indiana Calls for Uniform Accounting System

Indiana gas utilities with revenue of more than $250,000 a year must adopt a uniform system of accounting by Jan. 1, according to an order of the Indiana Public Service Commission. Thomas L. Kemp, general manager of the Citizens Gas and Coke utility here, said the utility here already is using a "setup similar to that ordered by the commission" and that whether an accounting change would have to be made was under discussion. The utilities will be given two years in which to revalue their property according to the new system of classification and valuation, the commission said. The system has been recommended by the National Association of Railroad and Utility commissioners and is used in 22 states.

Indianapolis Gas Co. Officers

All officers and directors of the Indianapolis Gas Company have been re-elected for 1938. Will G. Irwin of Columbus, Ind., was re-elected president. Other officers renamed were Arthur V. Brown, vice-president and treasurer; William J. Yule, secretary. Directors named were Frederick G. Appel, Mr. Brown, Louis B. Ewbank, William R. Higgins, Mr. Irwin, Peter C. Reilly and Obie J. Smith.

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IMPROVED EQUIPMENT — RUSSELL ENGINEERING

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Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK, NEW JERSEY

(Continued from page 22)

between primer and coating which is weaker than the bond within or between either the primer and/or coating.

The age of the primer following application effects bonds. Curing of each primer occurs in a definite period, usually only a few hours in duration. After the primer has become properly cured its melting point gradually increases with time. This change is usually produced by oxidation of some of the ingredients. Extended in time this action may cause the primer to become so dry that the bond with the pipe is broken. The primer will then leave the pipe in fine particles or flake off. The primer is thus a rather poor temporary paint for preventing atmospheric corrosion. Also the raising of the melting point of the primer due to oxidation decreases the possibility of producing a satisfactory bond and repriming is necessary. Repriming may result in an improvement in the bond strength compared with the decreased strength with the original primer but full strength, as judged by that possible with a primer newly cured, is seldom obtainable. The age of primer contained in sealed tins would not ordinarily affect the bonding value of the primer. Thorough stirring is essential as some of the ingredients tend to separate.

The method of application may have an effect on bond. A thin but uniform layer of primer is essential. Brushing by hand is the method most commonly recommended by experts. Other methods such as spraying, ragging, pouring, etc., all tend to leave droplets or ridges where the thickness of the primer increases the time required for curing. The added time is seldom allowed and therefore localized spots contain comparatively large quantities of primer vehicle. When hot coating is poured onto these localized spots the vehicle tends to boil and cause porosity in the coating. This porosity would also be produced by improper curing.

Flowability

The flowability of a primer is important in application and the time required for curing. Ease of application requires a liquid which will flow easily. Ease of application is desirable to minimize the physical exertion requred to spread the material. The less physical effort required the greater the tendency for the men applying the material to thoroughly brush the primer. Thorough brushing produces a uniform thickness and aids in forcing the primer into the minute pores and crevices in the pipe surface. Adhesion of the primer to the areas of smooth pipe surface is also improved by thorough brushing.

An easy flowing primer also makes possible a thinner layer than one more viscous. The thickness of a primer is an important factor in curing. The time required for proper curing increases by a ratio greater than the direct relationship of thicknesses. As an illustration a primer one and one-half times as thick as one of the same composition may require twice as long to cure. There is no particular advantage in a thick prime coat.

Absorption

The absorption of moisture by a primer would result in steam being forced by the hot coating and porosity would result in the coating. The thinness of a primer results in rather rapid absorption although the total amount absorbed cannot be large because of the small volume of primer. A real disadvantage is that some primers will act as a permeable skin and the moisture collect between the primer and pipe. The blister thus formed may gradually enlarge as the bond is broken. This fact is another disadvantage in the use of primers as temporary resistants to atmospheric corrosion.

(Continued in March Issue)

Obituary

J. A. P. CRISFIELD

James Alfred Pearce Crisfield, distinguished Savannahian, died at his White Bluff home at 3 o'clock, p. m., January 6, after a long illness.

Mr. Crisfield had been president of the Savannah Gas Company since 1925, when he asked to be transferred here after several years of exacting supervisory work in the construction of the Naugatuck Valley electric railroad in Connecticut. The United Gas Improvement Company, with which he was directly or indirectly connected for over fifty years, first sent him to Savannah as manager of the local subsidiary in 1892.

Born at Chestertown, Maryland, November 28, 1864, Mr. Crisfield attended the U. S. Naval Academy at Annapolis for something over a year, and to Washington College for four months, and in September, 1883, entered Stevens Institute of Technology in Hoboken, N. Y. While there, he showed a definite bent toward physics, mechanical drawing and thermo-dynamics.

While a senior, the United Gas Improvement Company chose him to demonstrate the Welsbach mantle, a contrivance to increase the efficiency of the flame, in 1887. He managed production of the mantles in New York, and later was sent to Ohio where he conducted durability tests of the Welsbach invention with natural gas. While there, he made improvements on Lowe Water Gas apparatus.

In 1892, he became manager of the Savannah Gas Company and began to take active part in the social and business life of the city. He married Miss Josephine Noble Jones in 1894.

When expansion of the United Gas Improvement Company into the electric field of public utility and refinement of gas processes necessitated the formation of a department of design, Mr. Crisfield was promoted to engineer of design and later became president of the Crisfield Contracting Company, a U. G. I. subsidiary. From 1899 to 1925, he supervised the efficiency, construction and frequently the operation of U. G. I. plants over the country.

At one time, chairman of the Committee of Sciences and Arts of the Franklin Institute in Philadelphia, Mr. Crisfield was later awarded its Longstreth medal of merit for invention. The Stevens Institute of Technology gave him an honorary degree of Doctor of Engineering in June, 1937. Since his return to Savannah in 1925, Mr. Crisfield had taken active part in civic affairs.

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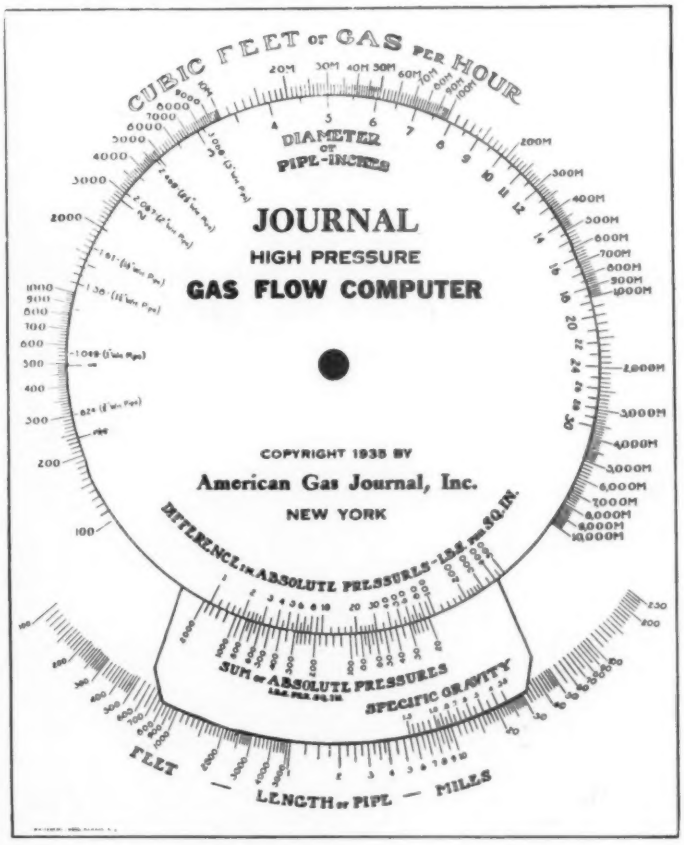

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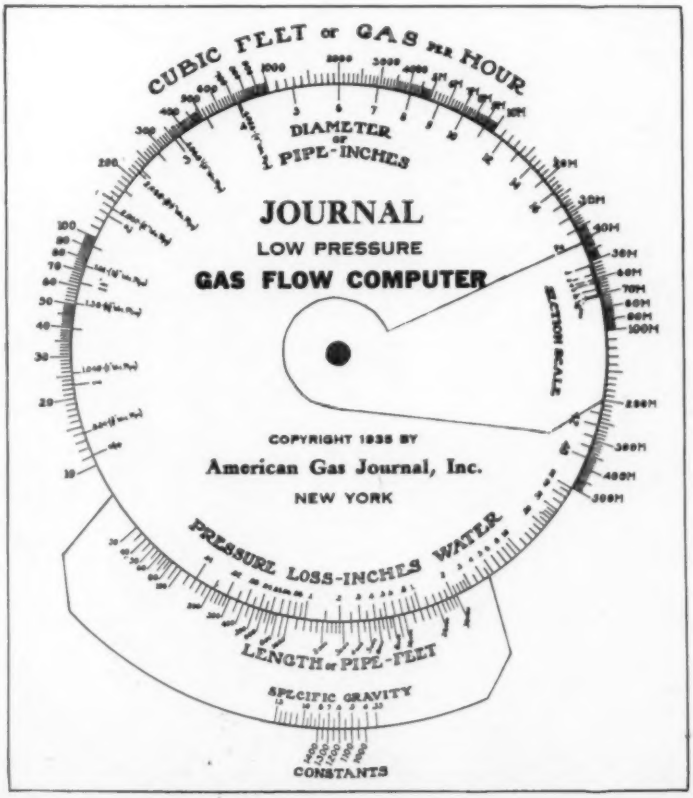

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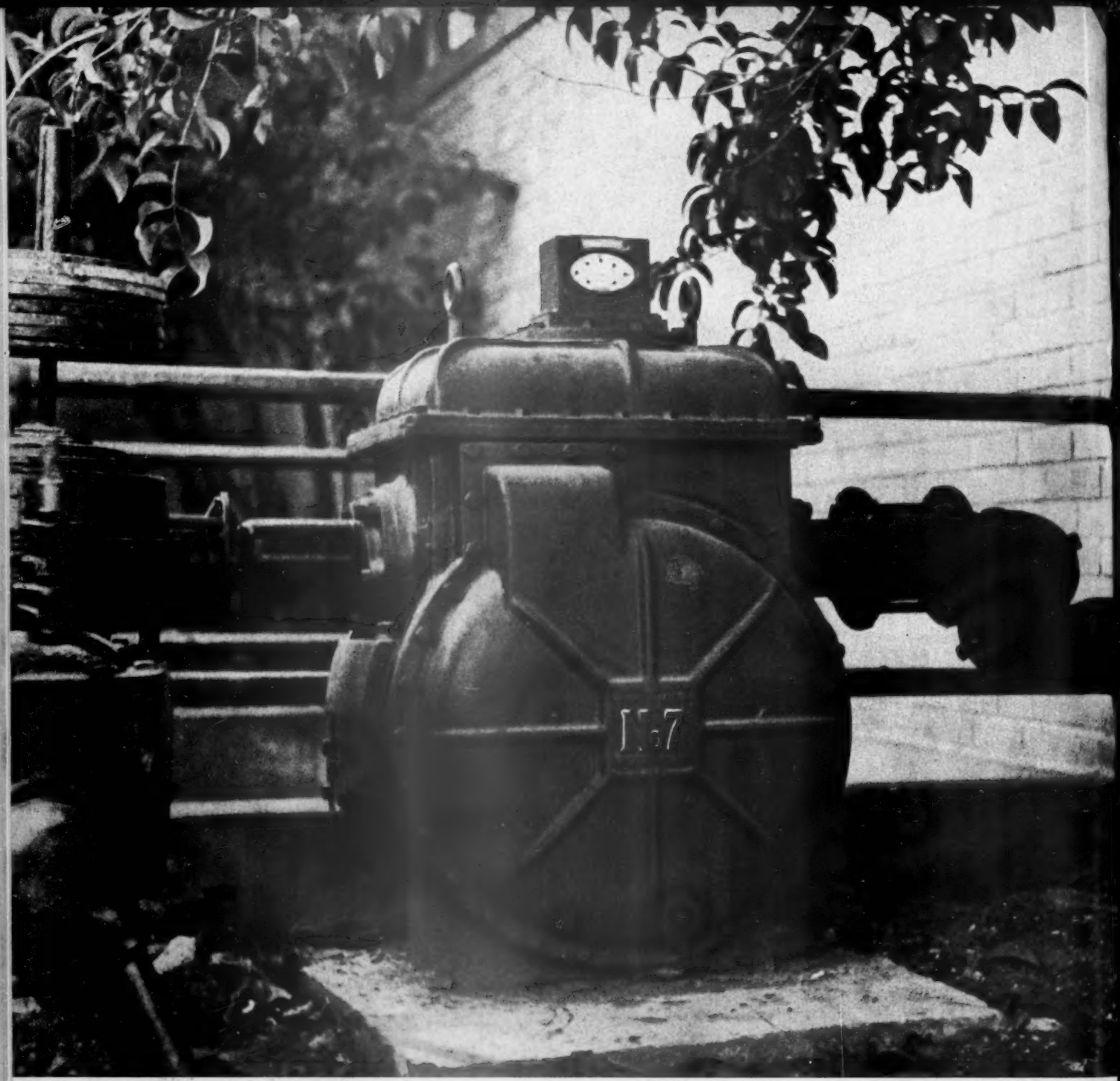

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